SAT

PRACTICE BOOK WITH SOLUTIONS

BOOK 3

PASSPORT TO ADVANCED MATH

Contains hundred of advance mathematics problems to train your mind.
Tons of questions to boost your understanding.

Arif Yetik, MA

454 $y = mx + b$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{2y}{8}$$

$$\frac{10x + x}{}$$

PREFACE

"The struggle is real." That is how I describe my many years of teaching Mathematics! From finding reference materials that contain almost everything I need to preparing students for international assessments like SAT, PSAT, CIE and IB have been quite a huge challenge because textbooks and other resources vary accordingly.

This practice book contains more exercises with solutions based on blended SAT Math curriculum. I have compiled as many questions as possible with corresponding solution for each type. SAT and PSAT exam preparation exercises are the central components and main focus of this workbook. I want users of this book to have an all-in-one go-to material where they can find everything they need to enhance their Math skills and eventually earn mastery of the topics.

Preparing students for SAT was my inspiration on why I came up with designing this practice book. My objective is to be able to help students achieve 600 points and above. This book is special as it contains questions with handwritten solutions.

This practice book is a product of my many years of teaching experience, and it took me a year to finally complete it. I am sure this will be a big help for students. Though this has a simple structure, I still suggest that students first review the topics from different resources, then take hold of this book and solve all practice questions to attain the target score.

Arif Yetik, MA

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CHAPTERS

1

If $a = 4\sqrt{2}$ and $2a = \sqrt{4b}$, what is the value of b?

A) 8
B) 16
C) 32
D) 64

2

If $\frac{a^{x^2}}{a^{y^2}} = a^{54}$, $a > 1$ and $x - y = 6$, what is the value of $x + y$?

A) 3
B) 9
C) 24
D) 27

3

Which of the following is equal to $b^{\frac{2}{5}}$?

A) $\sqrt{b^{\frac{2}{5}}}$
B) $\sqrt{b^{\frac{5}{2}}}$
C) $\sqrt[2]{b^5}$
D) $\sqrt[5]{b^2}$

4

$$\sqrt{m+3} - n = 0$$

In the equation above, if $n = 6$, what is the value of m?

A) 3
B) 9
C) 27
D) 33

CONTINUE

5

Which of the following is equal to $25^{\frac{3}{4}}$?

A) $\sqrt[3]{25}$

B) $5\sqrt{5}$

C) $\sqrt[4]{5}$

D) $\sqrt{5}$

6

If $\sqrt{x}+\sqrt{16}=\sqrt{25}$, what is the value of x?

A) 1

B) $\sqrt{9}$

C) 6

D) 9

7

Which of the following is equal to $\frac{a^{-3}\cdot b^{\frac{1}{2}}}{a^{-4}\cdot b}$?

A) $\frac{a}{2\sqrt{b}}$

B) $\frac{a}{\sqrt{b}}$

C) $\frac{1}{a^{-7}\sqrt{b}}$

D) $\frac{a\cdot b^2}{\sqrt{b}}$

8

If $a^{-\frac{1}{3}}=m$, where $a>0,$, what is the value of m?

A) $\frac{1}{\sqrt[3]{a}}$

B) $\sqrt[3]{a}$

C) $\sqrt[3]{a^2}$

D) $\sqrt[2]{a^{-3}}$

CONTINUE

9

$\sqrt{25a^2}$

If $a>0$, which of the following is equivalent to the given expression?

A) $50a^4$

B) $10a$

C) $5a^2$

D) $5a$

10

$\sqrt{y^2} = y$

Which of the following values of y is NOT solution to the equation above?

A) 2

B) 1

C) 0

D) -2

11

Which of the following is equivalent to $(4t)^{\frac{1}{3}}$?

A) $\sqrt[3]{4t}$

B) $2\sqrt[3]{t}$

C) $\frac{1}{12t^3}$

D) $(4t)^3$

12

If $a^3 = \sqrt{\sqrt{b}}$, where $b > 0$, what is the value of a in terms of b?

A) $b^{\frac{1}{7}}$

B) $b^{\frac{5}{12}}$

C) $b^{\frac{1}{12}}$

D) $b^{\frac{3}{4}}$

CONTINUE

13

Which of the following is equal to $\frac{1}{\sqrt{2}+1}$?

A) $\frac{\sqrt{2}}{2}-\frac{1}{2}$

B) $\sqrt{2}-1$

C) $\frac{\sqrt{2}}{2}+\frac{1}{2}$

D) $\sqrt{2}+1$

14

If $x^3=30$, and $y^2=10$, what is the value of $(x\cdot y)^6$?

A) 3×10^4

B) 9×10^4

C) 3×10^5

D) 9×10^5

15

If y is positive integer and $x=2^{y+3}+2^y$, what is 2^{y+2} in terms of x?

A) $\frac{x}{9}$

B) $\frac{4x}{9}$

C) $13x$

D) $36x$

16

What is the value of $5\sqrt{8}+6\sqrt{32}$?

A) $10\sqrt{2}$

B) $11\sqrt{40}$

C) $34\sqrt{2}$

D) $36\sqrt{2}$

CONTINUE

1

What is the value of $4\sqrt{50}-3\sqrt{32}$?

A) $8\sqrt{2}$
B) $12\sqrt{40}$
C) $20\sqrt{2}$
D) $32\sqrt{2}$

2

If $16b=2^{a+5}$, what is the value of b?

A) $32\cdot 2^{a}$
B) 2^{a+2}
C) $2\cdot 2^{a+2}$
D) 2^{a+1}

3

What is the value of $\frac{9\sqrt{24}}{4\sqrt{27}}$?

A) $3\sqrt{2}$
B) $\frac{3\sqrt{2}}{2}$
C) $2\sqrt{2}$
D) $\frac{2\sqrt{2}}{3}$

4

$$\sqrt{-x}-y=5$$

In the equation above, if $y=2$, what is the value of x?

A) -49
B) -27
C) 27
D) 49

CONTINUE

5

Which of the following is equal to $\frac{25^{4x}}{125^{3x}}$?

A) $\frac{1}{5}$

B) $\frac{1}{5^x}$

C) 5

D) 5^x

6

If $8^{12} = 4^x$, what is the value of x?

A) 9

B) 12

C) 18

D) 36

7

Which of the following is equivalent to $\frac{(a+a+a+a)\cdot(a+a)}{4^{-1}}$?

A) $16\cdot a$

B) $32\cdot a$

C) $16\cdot a^2$

D) $32\cdot a^2$

8

Which of the following is equivalent to $\frac{\sqrt{32}+4\sqrt{18}}{\sqrt{8}}$?

A) 2

B) $2\sqrt{2}$

C) 8

D) $8\sqrt{2}$

CONTINUE

9

If $a^2 = 9$, $b^2 = 16$, and $(a+3)\cdot(b-4) \neq 0$ what is the value of $a+b$?

A) -2
B) -1
C) 1
D) 2

10

If $\frac{1}{x-2} = \sqrt{2}$ what is the value x?

A) $\frac{\sqrt{2}+4}{2}$
B) $\frac{\sqrt{2}-4}{2}$
C) $\frac{\sqrt{2}-2}{2}$
D) $\frac{\sqrt{2}+2}{2}$

11

If $\frac{1}{3^x} = 3\sqrt{3}$ what is the value x?

A) $-\frac{3}{2}$
B) $-\frac{2}{3}$
C) $\frac{2}{3}$
D) $\frac{3}{2}$

12

If $(3{,}000)\cdot(4{,}000) = 1.2\times10^m$ what is the value m?

A) 6
B) 7
C) 8
D) 9

CONTINUE

13

If $2^a = 5$ what is the value $5 \cdot 4^a + 2^a$?

A) 55
B) 80
C) 125
D) 130

14

If $\left(3+2\sqrt{2}\right)^2 = a + b\sqrt{2}$, where a and b are integers, what is the value of $a+b$?

A) 17
B) 23
C) 29
D) 37

15

If $\frac{x}{4+\sqrt{7}} = \frac{4-\sqrt{7}}{y}$, what is the value of $(xy)^{\frac{3}{2}}$?

A) 9
B) 27
C) 54
D) 81

16

If $4^x = 25$, what is the value of 2^{x-2} ?

A) $\frac{5}{4}$
B) $\frac{5}{2}$
C) 5
D) 50

CONTINUE

1

If $f(a,b)=\frac{2a}{b^2}$, where a and b are positive integers, what is the value of $\frac{f(2a,4b)}{f(a,3b)}$?

A) $\frac{9}{16}$

B) $\frac{9}{8}$

C) $\frac{9}{4}$

D) $\frac{9}{2}$

2

If a is positive integer, and $3^a=b$, which of the following express $3b^2$ in terms of a?

A) $3\cdot 3^a$

B) 3^{2a}

C) 3^{a+2}

D) 3^{2a+1}

3

What is the smallest integer value of x such that $10^{-x}<0.000036$?

A) 4

B) 5

C) 6

D) 7

4

If $\frac{2}{2^{-m}}=4\sqrt{8}$, what is the value of m?

A) $\frac{5}{2}$

B) 3

C) $\frac{7}{2}$

D) $\frac{9}{2}$

CONTINUE

5

If $4\sqrt{50}-3\sqrt{8}=n\sqrt{2}$, what is the value of n?

A) 6
B) 12
C) 14
D) 20

6

If $8^{12}=4^{x}$, what is the value of x?

A) 9
B) 12
C) 15
D) 18

7

Which of the following is equivalent to $\frac{2}{3^{-1}\cdot(a+a+a)\cdot(a+a)}$?

A) $\frac{1}{a}$
B) $\frac{1}{a^2}$
C) a
D) a^2

8

Which of the following is equivalent to $\frac{7x\sqrt{3y}+x\sqrt{27y}}{2x\sqrt{3}}$?

A) $\sqrt{y}$
B) $5x\sqrt{y}$
C) $5\sqrt{y}$
D) $5\sqrt{3y}$

CONTINUE

9

If $2x-y=5$ what is the value of $\frac{4^x}{2^y}$?

A) 8
B) 16
C) 32
D) 64

10

If $x^{-\frac{1}{3}}=2$ what is the value x?

A) -8
B) $\frac{1}{8}$
C) $-\frac{1}{8}$
D) 8

11

If $m=1^1+1^3+1^5+\ldots+1^{99}$ what is the value m?

A) 25
B) 49
C) 50
D) 99

12

If $4^{3x-2}=\frac{1}{8^{x+5}}$ what is the value x?

A) -11
B) -9
C) $\frac{11}{9}$
D) $-\frac{11}{9}$

CONTINUE

13

If $3^{y+1}=10$ what is the value 3^{y-2}?

A) $\frac{3}{10}$

B) $\frac{10}{3}$

C) $\frac{10}{27}$

D) $\frac{27}{10}$

14

If $a^2b^3=64$, and $a^3b^2=16$ what is the value $a\cdot b$?

A) 2

B) 4

C) 5

D) 10

15

If $x\sqrt{x\sqrt{x}}=x^m$, what is the value of m?

A) $\frac{7}{4}$

B) $\frac{3}{4}$

C) $\frac{3}{2}$

D) 1

16

If $5\sqrt{x+3}=4\sqrt{5}$, what is the value of x?

A) $-\frac{1}{5}$

B) $\frac{1}{5}$

C) 5

D) 10

CONTINUE

1

$$\frac{2^{n+10}}{2^{n}} \cdot \frac{3^{2m}}{3^{2m-10}}$$

Assuming n is nonzero, which of the following expressions is equivalent to the expression above?

A) 2^{10}
B) 3^{10}
C) 6^{10}
D) 6^{20}

2

If $\left(x^{a+b}\right)^{a-b} = x^{64}$, and $a+b=16$, what is the value of $a-b$?

A) 4
B) 8
C) 12
D) 16

3

If $3^{x} \times 3^{y} = 81^{m}$, and $\frac{3^{x}}{3^{y}} = 9^{m-1}$, what is the value of x in terms of m?

A) $6m-3$
B) $6m-2$
C) $3m-2$
D) $3m-1$

4

If $6\sqrt[3]{x}+13=43$, what is the value of x?

A) 5
B) 25
C) 100
D) 125

CONTINUE

5

If $a = 3\sqrt{2}$ and $2a = \sqrt{3x}$, what is the value of x?

A) 6
B) 12
C) 24
D) 36

6

If $\sqrt[3]{y^2 + 4} = 5$, what is the value of y?

A) -9
B) -11
C) -12
D) -121

7

Which of the following is equivalent to $\frac{(4 \cdot x^2 \cdot y^3)^3}{(2 \cdot x \cdot y^2)^4} \cdot \frac{(8 \cdot x^3 \cdot y)}{(2 \cdot x \cdot y)^2}$?

A) $\frac{x^2}{2}$
B) $\frac{x^3}{4}$
C) $2x^2$
D) $8x^3$

8

Which of the following is equivalent to $\frac{(-1)^9 \cdot (-1)^{10} + (-1)^{21}}{(-1)^{11} \cdot (-1)^8}$?

A) -2
B) -1
C) 1
D) 2

CONTINUE

9

If $2^t \cdot 4^3 = 8^s$ what is the value of s in terms of t?

A) $t+6$

B) $\frac{t+6}{3}$

C) $t-6$

D) $\frac{t-6}{3}$

10

If $4^{x+3} = 16^{2x}$ what is the value x?

A) 1

B) 2

C) 4

D) 8

11

What is the value $\left(\sqrt{\frac{1}{3}+\frac{1}{6}}\right)\cdot\sqrt{8}$?

A) 1

B) $\sqrt{2}$

C) 2

D) 4

12

If $\sqrt[3]{3x^2-11} = 4$ what is the value x?

A) 3

B) 5

C) 8

D) 16

CONTINUE

13

What is the value $\sqrt{21+\sqrt{13+\sqrt{6+\sqrt{9}}}}$?

A) 4
B) 5
C) 6
D) 7

14

What is the value $\sqrt{\sqrt{13}+2}\cdot\sqrt{\sqrt{13}-2}$?

A) 3
B) 9
C) 13
D) 15

15

What is the value $\sqrt{0.04}+\sqrt{0.09}+\sqrt{0.25}$?

A) $\sqrt{10}$
B) $\sqrt{2}$
C) $\frac{\sqrt{10}}{10}$
D) 1

16

What is the value $\frac{5\sqrt{3}}{\sqrt{27}}\cdot\frac{\sqrt{45}}{\sqrt{12}}\cdot\frac{\sqrt{5}}{\sqrt{108}}$?

A) $\frac{7}{9}$
B) $\frac{20}{3}$
C) $\frac{25}{36}$
D) $\frac{18}{25}$

CONTINUE

1

Which of the following is equivalent to $\dfrac{1}{\dfrac{1}{x-2}-\dfrac{1}{x-3}}$?

A) $\dfrac{x^2-5x+6}{x+1}$

B) $-x^2+5x-6$

C) $\dfrac{x+1}{x^2-5x+6}$

D) $\dfrac{x-1}{x^2-5x+6}$

2

For a polynomial $P(x)$, the value of $P(-2)$ is 3. Which of the following must be true about $P(x)$?

A) $x-2$ is a factor of $P(x)$

B) $x+2$ is a factor of $P(x)$

C) $x+3$ is a factor of $P(x)$

D) The remainder when $P(x)$ is divided by $x+2$ is 3.

3

Which of the following is equivalent to $9x^4-12x^2y^2+4y^4$?

A) $(3x-2y)^4$

B) $(3x^2-2y^2)^2$

C) $(9x^2-4y^2)^2$

D) $(9x-4y)^4$

4

Which of the following is equivalent to $\dfrac{4x-3}{x+1}$?

A) 1

B) $4-\dfrac{1}{x+1}$

C) $4-\dfrac{7}{x+1}$

D) $4-7(x+1)$

CONTINUE

5

$$\left(-4x^2+7x-3\right)-3\left(-2x^2+3x-1\right)$$

If the expression above is rewritten in the form of polynomial ax^2+bx+c, where a, b, and c are constant, what is the value of a?

A) -10
B) -2
C) 2
D) 3

6

If $x^2+y^2=m$, and $xy=n$, which of the following is equivalent to $4m-8n$?

A) $(4x+4y)^2$
B) $(4x-4y)^2$
C) $(2x+2y)^2$
D) $(2x-2y)^2$

7

$$\frac{4x+5}{(x-2)^2}-\frac{4}{x-2}$$

If the expression above is rewritten in the form of polynomial $\frac{t}{(x-2)^2}$, where t *is positive* constant and $x\neq 2$. What is the value of t?

A) -13
B) -3
C) 3
D) 13

8

Which of the following is equivalent to $(1.2x-1.5)^2-\left(4.44x^2+1.25\right)$?

A) $-3x^2-3.6x+1$
B) $-3x^2+3.6x$
C) $3x^2-3.6x+1$
D) $-3x^2+3.6x+1$

CONTINUE

9

Which of the following is equivalent to $\frac{3x^2+4x}{x-2}$?

A) $3x-\frac{10x}{x-2}$

B) $3x+10+\frac{20}{x-2}$

C) $3x$

D) $x-2$

10

Which of the following is equivalent to $\left(\frac{x}{2}-y\right)^2$?

A) $\frac{x^2}{4}+y^2$

B) $\frac{x^2}{2}+y^2$

C) $\frac{x^2}{4}-xy+y^2$

D) $\frac{x^2}{4}+xy+y^2$

11

Which of the following is equivalent to $4(x-3)+11$?

A) $x-1$

B) $12x+11$

C) $-8x+11$

D) $4x-1$

12

Which of the following is equivalent to $x^2+10x+17$?

A) $(x+5)^2+17$

B) $(x+5)^2-17$

C) $(x+5)^2-8$

D) $(x+5)^2+8$

CONTINUE

13

Which of the following is equivalent to $\frac{x^2+4x+3}{x^2-x-2}$?

A) $\frac{x+3}{x+2}$

B) $\frac{x+3}{x-2}$

C) $\frac{x+1}{x-2}$

D) $\frac{x-1}{x+2}$

14

The expression $\frac{1}{5}x^2-3$ can be rewritten as $\frac{1}{5}(x-m)(x+m)$, where m *is positive* constant. What is the value of m?

A) -3

B) 10

C) 15

D) $\sqrt{15}$

15

$$(5019-163x^2)+23(7x^2-217)$$

The expression can be rewritten as mx^2+n, where m and n are positive constant. What is the value of $m+n$?

A) -30

B) -28

C) 26

D) 30

16

$$(5-x^2)-2(7-x^2+3x)+6x$$

Which of the following is equivalent to expression above?

A) x^2-9

B) $-x^2-9$

C) $-x^2+12x-9$

D) $-x^2-12x-9$

CONTINUE

1

Which of the following is equivalent to $\frac{5}{3x-1}+2$?

A) $\frac{6x-2}{3x-1}$

B) $6x+1$

C) $\frac{6x+3}{3x-1}$

D) $\frac{6x+7}{3x-1}$

2

$(3x-2)(ax+5)-6x^2+7=bx-3$

In the expression above, a and b are constant. What is value of a?

A) 2

B) 3

C) 9

D) 11

3

If $x+4$ is a factor of the expression $x^2+mx-12$, what is the value of m?

A) -3

B) 1

C) 3

D) 4

4

Which of the following is equivalent to $\frac{4x-3}{12}$?

A) $\frac{x-3}{4}$

B) $\frac{4x-1}{3}$

C) $\frac{x}{3}-\frac{1}{4}$

D) $\frac{x}{4}-\frac{1}{3}$

CONTINUE

5

If the polynomial $P(x)$, has factors of 6, $(x-4)$, and $(x+5)$, Which of the following must also be a factor of $P(x)$?

A) $6x^2-24$
B) $6x^2+30$
C) $x^2-8x+16$
D) $3x^2+3x-60$

6

Which of the following is a factor of x^3-8?

A) x^2-2
B) x^2+2x+4
C) x^2-2x+4
D) $x+2$

7

$$\frac{4x}{x-3}\div\frac{12}{3x-9}$$

Which of the following is equivalent to the expression above, given that $x\neq 3$?

A) x
B) $2x$
C) $x-3$
D) $\frac{x}{3}$

8

Which of the following is NOT equivalent to $8a^2$?

A) $4a^2+4a^2$
B) $\left(2a\sqrt{2}\right)^2$
C) $8a(a)$
D) $(4a)\cdot(4a)$

CONTINUE

9

What is the coefficient of x^2 when $21x^2 - \frac{1}{5}x + 3$ is multiplied by the $10x - \frac{1}{7}$?

A) -5
B) -1
C) 1
D) 5

10

Which of the following is equivalent to $\left(\frac{x}{2} - 2y\right)^2$?

A) $\frac{x^2}{4} + y^2$
B) $\frac{x^2}{2} + y^2$
C) $\frac{x^2}{4} - xy + y^2$
D) $\frac{x^2}{4} + xy + y^2$

11

Which of the following is equivalent to $\frac{x^4 + x^3}{x^3 + x^2}$?

A) $\frac{x^7}{x^5}$
B) $2x$
C) x
D) 1

12

Which of the following is factor of polynomial of $a^2 - 12a + 9$?

A) $(a-6)^2 - 9$
B) $(a-6)^2 - 27$
C) $(a+6)^2 - 9$
D) $(a+6)^2 + 27$

CONTINUE

13

Which of the following is equivalent to $16a^4 + 8a^2b^2 + b^4$?

A) $(2a-b)^4$

B) $(2a-b)^2(2a+b)^2$

C) $(4a+b)^2(a-b)^2$

D) $(4a^2+b^2)^2$

14

Which of the following is equivalent to $\dfrac{2-\frac{1}{x}}{2+\frac{1}{x}}$?

A) $\dfrac{2x-1}{2x+1}$

B) $\dfrac{2x+1}{2x-1}$

C) $\dfrac{4x^2-1}{x^2}$

D) 1

15

Which of the following is equivalent to $\dfrac{ab-a^2}{ab+a^2}$?

A) $-\dfrac{a}{b}$

B) $-\dfrac{b}{a}$

C) $\dfrac{b-a}{a+b}$

D) $\dfrac{b+a}{a-b}$

16

Which of the following is equivalent to $4x^4 - 4$?

A) $4(x^2-1)^2$

B) $4(x^2+1)^2$

C) $4(x^3-1)(x+1)$

D) $4(x^2+1)(x-1)(x+1)$

CONTINUE

1

Which of the following is equivalent to $\frac{2}{x}+\frac{3}{4}$?

A) $\frac{5}{4x}$

B) $\frac{5}{4+x}$

C) $\frac{8}{3x}$

D) $\frac{8+3x}{4x}$

2

$$\frac{3x^2+4}{x-1}=m+\frac{7}{x-1}$$

In the expression above, m is a constant. What is the value of m?

A) $3x-5$

B) $3x-4$

C) $3x+3$

D) $3x+4$

3

If $x\neq 0$, what is the value of $\frac{2(5x)^2-5(2x)^2}{(2x)\cdot(3x)}$?

A) -1

B) 1

C) 5

D) $5x$

4

Which of the following is equivalent to $\frac{6x-5}{x+2}$?

A) $\frac{6-5}{1+2}$

B) $6-\frac{17}{x+2}$

C) $6-\frac{5}{x+2}$

D) $\frac{6}{x+2}-\frac{5}{x+2}$

CONTINUE

5

$$\frac{5a^2-4a+1}{a-2}=5a+6+\frac{n}{a-2}$$

In the expression above, n is a constant. What is the value of n?

A) $2a-1$

B) 11

C) 13

D) $11x+13$

6

$$P(x)=2x^3-kx^2+4x-5$$

In the expression above, k is a constant. If $P(x)$ is divisible by $x+1$, what is the value of k?

A) -13

B) -11

C) 11

D) 13

7

$$\frac{6x^2+5x+2}{2x+1}=\frac{1}{2x+1}+m$$

In the expression above, m is a constant. What is the value of m?

A) $3x+1$

B) $3x-1$

C) $3x^2+x$

D) $2x^2+x+2$

8

Which of the following is equivalent to $\frac{4t}{t-2}$?

A) $4-2t$

B) 2

C) $4-\frac{8}{t+2}$

D) $4+\frac{8}{t-2}$

CONTINUE

9

$$P(x) = 2x^3 - kyx^2 + 5xy + 2y - 2$$

In the expression above, k is a constant. If $P(x)$ is divisible by $x - 1$, what is the value of k?

A) -7
B) $-7y$
C) 7
D) $7y$

10

$$2x^2 - 4x - 3 = A(x-1) + B$$

In the expression above, A *and* B are constant, what is the value of A in terms of x?

A) $2x - 2$
B) $2x + 2$
C) $-2x + 2$
D) -5

11

$$3x^2 + 5x - 6 = (ax + b)(x + 2) + c$$

In the expression above, where a, b *and* c are constant, what is value the of $a+b+c$?

A) -5
B) -2
C) 0
D) 8

12

$$P(x) = mx^4 + nx^3 - 3x^2 + 5x$$

In the expression above, m *and* n are constant. If $P(x)$ is divisible by $x - 1$, and $x + 1$, what is the value of m?

A) -2
B) 1
C) 3
D) 5

CONTINUE

13

For a polynomial $P(x)$, $P(-2)=0$. Which of the following must be true about $P(x)$?

A) $-2x$ is a factor of $P(x)$

B) $-2x+2$ is a factor of $P(x)$

C) $x-2$ is a factor of $P(x)$

D) $x+2$ is a factor of $P(x)$

14

If the polynomial $P(x)$ is divisible by $x-5$, which of the following could be $P(x)$?

A) $2x^2-7x-15$

B) $2x^2+7x-15$

C) $2x^2-7x+15$

D) $2x^2+7x+15$

15

Which of the following is equivalent to $\frac{x^3y-xy^3}{x^2y-xy^2}$?

A) $x+y$

B) $x-y$

C) xy

D) $\frac{x+y}{x-y}$

16

For a polynomial $P(x)$, $P\left(\frac{3}{4}\right)=0$. Which of the following must be a factor of $P(x)$?

A) $3x+4$

B) $3x-4$

C) $4x+3$

D) $4x-3$

CONTINUE

1

Which of the following is equivalent to $\frac{6xy(4x-5)-3x(8y-7xy)}{3xy}$?

A) -18
B) $15x-18$
C) 18
D) $15x+18$

2

$$2x^2+3x+ax+b=(c-2)x^3+dx^2+c$$

In the expression above, *a, b, c, and d* are constant. What is the value of $a+b+c+d$?

A) 3
B) 4
C) 6
D) 8

3

$$\frac{1}{x^2+3x+2}=\frac{A}{x+2}+\frac{B}{x+1}$$

In the expression above, *A, and B* are constant. What is the value of $A\cdot B$?

A) -2
B) -1
C) 1
D) 2

4

$$\frac{3x-2}{(x-3)(x+1)}=\frac{A}{x-3}+\frac{B}{x+1}$$

In the expression above, *A, and B* are constant. What is the value of $\frac{A}{B}$?

A) $\frac{5}{4}$
B) $\frac{7}{5}$
C) $\frac{7}{4}$
D) $\frac{1}{4}$

CONTINUE

5

If $a-b=4$, and $a\cdot b=3$, where a and b are real numbers. What is the value of a^2+b^2?

A) 10
B) 16
C) 22
D) 28

6

If $a+b=4$, and $a\cdot b=3$, where a and b are real numbers. What is the value of a^3+b^3?

A) 28
B) 48
C) 52
D) 56

7

If $b-a=8$, and $a-c=10$, where a, b and c are real numbers. What is the value of $ab+bc-ac-b^2$?

A) 144
B) 108
C) 88
D) -144

8

Which of the following is equivalent to $\dfrac{\dfrac{t-1}{1}}{\dfrac{1}{t}-1}\div t-1$?

A) -2
B) 0
C) $\dfrac{t}{1-t}$
D) t

CONTINUE

9

$$P(x) = x^3 + 4x^2 + 2mx - 5$$

In the expression above, m is a constant. If $P(x)$ is divisible by $x - 1$, what is the value of m?

A) -2
B) -1
C) 0
D) 1

10

$$7x^2 + x + 5 = A(x + 2) + B$$

In the expression above, A *and* B are constant, what is the value of B?

A) $7x - 13$
B) $7x + 13$
C) 13
D) 31

11

$$4x^2 + 10x + 2 = (ax - b)(cx + 3) + 8$$

In the expression above, where a, b *and* c are constant, what is value the of $a+b+c$?

A) 3
B) 5
C) 6
D) 9

12

$$P(x) = 2x^3 + ax^2 + 5x + 2$$

In the expression above, a is a constant. If $P(x)$ is divisible by $x + 2$, what is the value of a?

A) -6
B) -4
C) 4
D) 6

CONTINUE

13

Which of the following is equivalent to $\frac{a^2-b^2}{a-b}+\frac{a^2-b^2}{a+b}=?$

A) a

B) $2a$

C) b

D) 2

14

Which of the following is equivalent to $\frac{x^2-x}{x^2-x+1}\div\frac{1-x^2}{x^3+1}?$

A) $1-x$

B) $x+1$

C) $-x$

D) x

15

Which of the following is equivalent to $\frac{x-1}{x+2}\cdot\frac{x^2+3x+2}{x^2-1}?$

A) 1

B) $\frac{1}{x-1}$

C) $\frac{1}{x+2}$

D) $x+2$

16

Which of the following is equivalent to $\frac{x^2-1}{x-1}-\frac{x^2+1}{x+1}?$

A) $\frac{2x-1}{x+1}$

B) $\frac{2x}{x+1}$

C) $\frac{2x+1}{x+1}$

D) x

CONTINUE

1

If $m > 0$ and $m^2 - 9 = 0$, what is the value of m?

A) -9
B) -3
C) 3
D) 9

2

$$\sqrt[3]{2t^2 + 46} - x = 0$$

If $t > 0$ and $x = 4$, what is the value of t?

A) 1
B) 3
C) 6
D) 9

3

What is the sum of all values of x that satisfy $12x^2 - 13x + 1 = 0$?

A) $\frac{12}{13}$
B) $\frac{13}{12}$
C) $\frac{1}{13}$
D) $\frac{1}{12}$

4

What is the product of all values of x that satisfy $2x^2 - 15x - 8 = 0$?

A) $\frac{2}{15}$
B) $\frac{15}{2}$
C) $-\frac{1}{4}$
D) 8

CONTINUE

5

What are the solutions to $3x^2-6x+1=0$?

A) $1\pm\frac{\sqrt{6}}{3}$

B) $6\pm\frac{\sqrt{6}}{3}$

C) $-1\pm\frac{\sqrt{6}}{3}$

D) $-6\pm\frac{\sqrt{6}}{3}$

6

$$x^3\left(x^2-10\right)=-9x$$

If $x>0$ what is the one possible solution to the equation above?

A) 2

B) 3

C) 6

D) 9

7

$$2x^3+3x^2-7x-8=0$$

For what values of x, is the equation above true?

A) -2

B) -1

C) 1

D) 2

8

What are the solutions of the quadratic equation $2x^2-10x-12=0$?

A) $x=-6$ and $x=-1$

B) $x=-6$ and $x=1$

C) $x=-1$ and $x=6$

D) $x=1$ and $x=6$

CONTINUE

9

$$y = 2x^2$$
$$2y + 4 = 2(x + 3)$$

If (x, y) is a solution of the system of equations above and $x > 0$ what is the value of xy?

A) -2
B) -1
C) 1
D) 2

10

$$2x^2 - 5x = m$$

In the equation above, m is a constant. If equation has no real solutions, which of the following could be the value m?

A) -4
B) -3
C) 3
D) 4

11

What is the sum of solutions to $(x + 5.2)(x - 1.2) = 0$?

A) -6.4
B) -4
C) 4
D) 6.4

12

In the equation $(bx - 3)^2 = 25$, b is a constant. If $x = 2$ is one solution to the equation, what is a possible value of b?

A) -4
B) -2
C) -1
D) 2

CONTINUE

13

$$y = 3x^2 - x - 3$$
$$y = -2x + 7$$

If (x, y) is a solution of the system of equations above, what is the one possible value of y?

A) -2
B) -1
C) 1
D) 11

14

$$\sqrt{3x+10} + 5 = x + 7$$

What is the solution set of equation above?

A) $\{-3, -2\}$
B) $\{-3, 2\}$
C) $\{-2, 3\}$
D) $\{2\}$

15

$$y = x^2 - x + 3$$
$$y - 4x + 7 = 0$$

How many solution are there to the system of equations above?

A) There are no solutions.
B) There is exactly one solution.
C) There are exactly two solutions.
D) There are exactly four solution.

16

$$ax^3 + bx^2 + cx + d = 0$$

In the equation above, a, b, c, and d are constant. If the equation has roots, -2, 3, and 7, which of the following is a factor of $ax^3 + bx^2 + cx + d = 0$?

A) $x - 7$
B) $x - 2$
C) $x + 3$
D) $x + 7$

CONTINUE

1

$$m^2 - m - 20 = 0$$

If m is a solution of the equation above and $m < 0$, what is the value of m?

A) -5
B) -4
C) -3
D) -1

2

$$\frac{9}{x-2} = x - 2$$

In the equation above, which of the following is a possible value of $x - 2$?

A) -9
B) -1
C) 3
D) 9

3

$$\frac{x}{x-2} = \frac{3x}{3}$$

Which of the following are a possible value of x?

A) 0 and 2
B) 0 and 3
C) 0 and 5
D) 2 and 5

4

$$\sqrt{x+6} = -x$$

What is the solution set of equation above?

A) $\{-2\}$
B) $\{3\}$
C) $\{-2,3\}$
D) There are no solutions.

CONTINUE

5

$$\sqrt{x^2} = x$$

Which of the following is the solution of the equation above?

A) -4
B) -2
C) 2
D) There are no solutions.

6

$$\frac{x^2-4}{x+2} = -2$$

What are the solutions to the equation above?

A) $x = -2$ and $x = 0$
B) $x = -2$ and $x = 2$
C) $x = 0$ and $x = 2$
D) $x = 0$

7

$$\frac{x^2-4}{x-2} = 4$$

What are the solutions to the equation above?

A) There are no solutions.
B) $x = 2$
C) $x = 2$ and $x = 4$
D) $x = -2$ and $x = 4$

8

$$\sqrt{2x} = x - 4$$

What are the solutions to the equation above?

A) $\{-8, -2\}$
B) $\{8\}$
C) $\{2, 8\}$
D) There are no solutions.

CONTINUE

9

$$2x^2 = 5x + c$$

In the equation above, c is a constant. If $x = 2$ is a solution of this equation, what other value of x satisfies the equation?

A) $\frac{-1}{2}$

B) 0

C) $\frac{1}{2}$

D) $\frac{3}{4}$

10

$$x + \frac{25}{x} = 10$$

In the equation above, if $x > 0$, what is the solution of the equation?

A) -5

B) 1

C) 2

D) 5

11

Which of the following are solutions to the quadratic equation $(x+2)^2 = \frac{4}{9}$?

A) $x = -\frac{8}{3}$ and $x = \frac{4}{3}$

B) $x = -\frac{8}{3}$ and $x = \frac{-4}{3}$

C) $x = -\frac{2}{3}$ and $x = \frac{2}{3}$

D) $x = -2$ and $x = 2$

12

In the equation $(ax+1)^2 = 9$, a is a constant. If $x = 2$ is one solution to the equation, what is a possible value of a?

A) -3

B) -2

C) -1

D) 2

CONTINUE

13

$$\frac{x^2-x-6}{x+3}=\sqrt{3x+10}$$

In the equation above can be solved for two solutions, one of which is extraneous. What is the value of the extraneous solution?

A) -3

B) -2

C) 2

D) 3

14

If $6t^2-5t-6=0$, what is the possible value of t?

A) $-\frac{3}{2}$

B) $-\frac{2}{3}$

C) $\frac{2}{3}$

D) $\frac{3}{4}$

15

$$\frac{2}{3y}=\frac{y}{12}$$

What are the solutions to the equation above?

A) $\{-2,2\}$

B) $\{-4,4\}$

C) $\{2,8\}$

D) $\{-2\sqrt{2},2\sqrt{2}\}$

16

The equation $x^2-4x=-1$ has two solutions for x. What is the larger value of x?

A) $2-\sqrt{3}$

B) $\sqrt{3}$

C) $2+\sqrt{3}$

D) 5

CONTINUE

1

$$3x^2-4x-2=0$$

Which of the following is solution to the quadratic equation shown above?

A) $\frac{4\pm\sqrt{10}}{6}$

B) $\frac{2\pm\sqrt{10}}{6}$

C) $\frac{2\pm\sqrt{10}}{4}$

D) $\frac{2\pm\sqrt{10}}{3}$

2

$$2x^2=7x-m$$

If one of the solutions of the equation above $x=-\frac{3}{2}$, which of the following is the other possible value of x?

A) -15

B) -5

C) 2

D) 5

3

If $3x^2=63-12x$ and $x<0$, what is the value of x^2?

A) 64

B) 49

C) 36

D) 9

4

If $x^2=2x+15$ and $x>0$, what is the value of x^3?

A) -125

B) -27

C) 27

D) 125

CONTINUE

5

Which of the following equation has NO real solutions?

A) $x^2 - 5x - 2 = 0$

B) $x^2 - 3x - 3 = 0$

C) $x^2 - 6x + 11 = 0$

D) $x^2 - 2x - 15 = 0$.

6

$$2x^2 + 8x + 4 = 0$$

What are the solutions to the equation above?

A) $-2 \pm \sqrt{2}$

B) $-4 \pm 4\sqrt{2}$

C) $4 \pm 4\sqrt{2}$

D) $2 \pm \sqrt{2}$

7

$$3x^2 = 10x - 8$$

If m and n are the two solutions to the equation above and $m > n$, what is the value of n^2?

A) 9

B) $\frac{4}{9}$

C) $\frac{16}{9}$

D) 4

8

What is the sum of the solutions of the equation $(2x-3)^2 = 4x - 3$?

A) -4

B) -3

C) 3

D) 4

CONTINUE

9

$$x^2 + 2x - 7 = 0$$

What are the solutions to the equation above?

A) $-1 \pm 2\sqrt{2}$

B) $1 \pm 2\sqrt{2}$

C) -1 ± 4

D) 1 ± 4

10

$$x^4 - 81 = 0$$

In the equation above, if $x < 0$, what is the solution of the equation?

A) -9

B) -6

C) -3

D) -2

11

Which of the following are solutions to the quadratic equation $\frac{x^2 - 3x + 2}{x^2 + 5x - 6} = 0$?

A) $\{1, 2\}$

B) $\{2\}$

C) $\{-6, 1\}$

D) $\{-1\}$

12

Which of the following are solutions to the quadratic equation $x^3 + 10x^2 + 24x = 0$?

A) $\{0\}$

B) $\{-6, -4, 0\}$

C) $\{-6, -4\}$

D) $\{-2, 2\}$

CONTINUE

13

Which of the following are solutions to the quadratic equation $6x^2+5x=4-7x-3x^2$?

A) $-\frac{2\mp 2\sqrt{2}}{3}$

B) $\frac{12\mp 2\sqrt{2}}{18}$

C) $\frac{2\mp 12\sqrt{2}}{3}$

D) There is no solution.

14

If the equation of $mx^2+(2m+1)x+m-1=0$, has double root, what is the possible value of m?

A) 8

B) 4

C) $\frac{1}{8}$

D) $-\frac{1}{8}$

15

$$\left.\begin{array}{l} x+y=5 \\ x\cdot y=6 \end{array}\right\}$$

What are the solutions to the system of equation above?

A) $\{(1,3)(2,1)\}$

B) $\{(2,3)(3,3)\}$

C) $\{(2,3)(3,2)\}$

D) $\{(3,2)\}$

16

What is the product of the roots of the equation of $x^2+\sqrt{2}x-4=0$?

A) $\sqrt{2}$

B) $-\sqrt{-2}$

C) 4

D) -4

CONTINUE

1

$$ax^2-2(a-1)x+a=0$$

If x_1 and x_2 are solution of the equation above and $x_1=x_2$, what is the value of a?

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) 0

D) 1

2

$$2x^2+ax+2=0$$

In the equation above, one of the roots of equation is -2, which of the following is a possible value of a?

A) 1

B) 2

C) 3

D) 5

3

$$3x^2+2x-1=0$$

Which of the following is a possible value of x?

A) $-\frac{1}{3}$

B) -1

C) 1

D) $\frac{2}{3}$

4

$$2x^2+mx+m-2=0$$

If x_1 and x_2 are solution of the equation above and $x_1=x_2$, what is the value of m?

A) $\frac{1}{2}$

B) 2

C) $\frac{8}{3}$

D) 4

CONTINUE

5

Which of the following is the sum of the roots of the equation of $(x-1)(x-4)=2-2x$?

A) 2
B) 3
C) 4
D) 5

6

$$x^2 - 13x - 36 = 0$$

If x_1 and x_2 are solution of the equation above, what is the value of $\frac{x_1 + x_2}{x_1 \cdot x_2}$?

A) $-\frac{13}{12}$
B) $-\frac{1}{3}$
C) $-\frac{13}{36}$
D) 0

7

$$x^2 - 2tx + t^2 = 0$$

If x_1 and x_2 are solution of the equation above and $x_1 + x_2 = x_1 \cdot x_2$, what is the value of t?

A) -2
B) -1
C) 1
D) 2

8

$$2+\sqrt{2x+11}=x$$

What are the solutions to the equation above?

A) $\{7\}$
B) $\{1,7\}$
C) $\{-7,-1\}$
D) $\{-1,7\}$

CONTINUE

9

$$x^2+(3m-1)x+24=0$$

In the equation above, m is a constant. If $x=3$ is a solution of this equation, what other value of x satisfies the equation?

A) -8
B) 3
C) 6
D) 8

10

$$\frac{x-3}{x+2}=\frac{1}{2x-2}$$

In the equation above, if $x>1$, what is the solution of the equation?

A) 1
B) 2
C) 3
D) 4

11

Which of the following are solutions to the quadratic equation $\sqrt{2x^2-14x+21}+4=x$?

A) $\{-1,1\}$
B) $\{5\}$
C) $\{4,5\}$
D) $\{1,2\}$

12

In the equation $mx^2+3m^2x-6=0$, m is a constant. If $x_1+x_2=6$, what is a possible value of $x_1\cdot x_2$?

A) -3
B) -2
C) 3
D) 6

CONTINUE

13

$$\frac{x^2+7x-8}{x^2-3x+2}=0$$

What are the solutions to the equation above?

A) $\{1,2\}$

B) $\{-8,1\}$

C) $\{-8,1,2\}$

D) $\{-8\}$

14

If $3m^2+15m+12=0$, what is the possible value of m?

A) $-\frac{4}{3}$

B) -1

C) $\frac{4}{3}$

D) 4

15

$$\frac{y+1}{2}=\frac{3}{y+2}$$

What are the solutions to the equation above?

A) $\{-1,4\}$

B) $\{-1,-4\}$

C) $\{1,-4\}$

D) $\{1,4\}$

16

$$\frac{x^2-3x+2}{x^2+5x-6}=0$$

What are the solutions to the equation above?

A) $\{2\}$

B) $\{-6,1\}$

C) $\{-1\}$

D) $\{6\}$

CONTINUE

1

What are the solutions to $2x^2 + 5x + 3 = 0$?

A) $\left\{-\frac{1}{2}, 3\right\}$

B) $\left\{\frac{1}{2}, 3\right\}$

C) $\left\{-1, \frac{1}{3}\right\}$

D) $\left\{-\frac{2}{3}, -1\right\}$

2

If the quadratic equation $ax^2 - (3a - 1)x + 1 = 0$ has two equal roots, what could be the value of a?

A) $\frac{1}{8}$
B) $\frac{1}{6}$
C) $\frac{1}{4}$
D) 1

3

If -1 is one of the zeros of the equation $(m + 1)\,x^2 - 7x + 3m - 4 = 0$, what is the value of the m?

A) -2
B) -1
C) 0
D) 1

4

A rectangle has length 4 cm greater than width. If the area is 96 cm^2, what is the perimeter of rectangle?

A) 20
B) 24
C) 40
D) 48

CONTINUE

5

When a tennis ball is hit directly upwards, its height h above the ground is given by $h = 2 + 6t - t^2$ meters, where t is the time in seconds after the ball is hit. When is the ball height of 11 meters?

A) 2
B) 3
C) 6
D) 11

6

A baker baking cakes finds that his profit per hour, $\$P$, $P = 36d - d^2$, where d is the number of cakes made per hour. How many cakes must the company make per hour in order to make $320 profit?

A) 12
B) 15
C) 20
D) 24

7

What are the solutions to $x^4 - 17x^2 + 16 = 0$?

A) $\{-4, -1, 1, 4\}$
B) $\{-4, 4\}$
C) $\{1, 16, \}$
D) $\{-1, 1, 16\}$

8

$$x + \frac{36}{x} = 12$$

In the equation above, if $x > 0$, what is the solution of the equation?

A) 6
B) 9
C) 12
D) 36

CONTINUE

9

What are the solutions to $6x^2 + 5x = 4 - 7x - 3x^2$?

A) $\frac{2 \pm 2\sqrt{2}}{3}$

B) $\frac{2 \pm 12\sqrt{2}}{3}$

C) $\frac{-12 \pm 2\sqrt{2}}{18}$

D) $\frac{-2 \mp 2\sqrt{2}}{3}$

10

$$\sqrt[3]{t^2 + 15} + x = 11$$

In the equation above, if $x = 7, and\ t > 0$, what is the value of t?

A) -7

B) 7

C) 14

D) 49

11

$$ax^3 + bx^2 + cx + d = 0$$

In the equation above, $a, b, c, and\ d$, constant. If the equation has roots $-5, -3, and\ 4$, which of the following is a factor of $ax^3 + bx^2cx + d = 0$?

A) $x - 5$

B) $x - 3$

C) $x + 4$

D) $x - 4$

12

What are the solutions to $x + \sqrt{x} = 6$?

A) $\{-3, 2\}$

B) $\{4, 9\}$

C) $\{-3, 2, 4, 9\}$

D) $\{4\}$

CONTINUE

13

What are the solutions to $\frac{x^2-x-20}{x^2-2x-24} = 0$?

A) $\{-4, 5\}$
B) $\{-4, 5, 6\}$
C) $\{5\}$
D) $\{5, 6\}$

14

What are the solutions to $x^3 + x^2 - 4x - 4 = 0$?

A) $\{-2, 2\}$
B) $\{-2, -1, 2\}$
C) $\{-1, 1, 4\}$
D) $\{-1, 1\}$

15

If -2 is one of the roots of the equation $3x^2 - (a - b)x - 6 = 0$, what is the value of the other root of the equation?

A) 3
B) 1
C) -1
D) -3

16

$$x^2 + \sqrt{2}x - 4 = 0$$

A) $\sqrt{2}$
B) $-\sqrt{2}$
C) 4
D) -4

CONTINUE

1

$$f(x)=mx^2+24$$

For the function f defined above, m is a constant and $f(-4)=8$. What is the value of $f(4)$?

A) -8
B) -1
C) 4
D) 8

2

$$g(x)=\frac{1}{(x-3)^2+4(x-3)+4}$$

For what value of x is the function g above undefined?

A) -2
B) -1
C) 1
D) 2

3

A function f satisfies $f(3)=11$ and $f(5)=6$.
A function g satisfies $g(3)=4$ and $g(6)=3$
What is the value of $f(g(f(5)))$?

A) 3
B) 4
C) 6
D) 11

4

$$y=a(x-3)(x+5)$$

In the quadratic equation above, a is nonzero constant. The graph of the equation in the $xy-$ plane is parabola with vertex (h,k). Which of the following is equal to k?

A) $-16a$
B) $-12a$
C) $12a$
D) $16a$

CONTINUE

5

In the $xy-$ plane is parabola with equation $y=f(x)=(x-8)^2$ intersects the line with the equation $y=9$ at two points, M and N. What is the length of $\overline{MN}$?

A) 5
B) 6
C) 11
D) 16

6

x	1	2
$f(x)$	-1	1

The table above shows some values of the linear function f. Which of the following defines f?

A) $2x-3$
B) $2x-1$
C) $2x+1$
D) $2x+3$

7

$$f(x)=\frac{2}{3}x+n$$

In the function above, n is a constant. If $f(6)=9$, what values of $f(-3)$?

A) -2
B) 3
C) 5
D) 7

8

If $f(x)=-3x+7$, what values of $f(-2x)$?

A) $f(x)=-6x+7$
B) $f(x)=6x+7$
C) $f(x)=-6x+3$
D) $f(x)=6x+3$

CONTINUE

9

In the $xy-$ plane, the graph of function f has $x-$ intercepts at $-2,\ 1, and\ 4$. Which of the following could define f ?

A) $f(x)=(x-2)(x+1)(x+4)$

B) $f(x)=(x+2)(x+1)(x-4)$

C) $f(x)=(x-2)(x-1)(x+4)$

D) $f(x)=(x+2)(x-1)(x-4)$

10

$$h(x)=(x-6)(x+4)$$

Which of the following is an equivalent form of the function above in which the minimum value of h appears as a constant?

A) $h(x)=(x-1)^2+25$

B) $h(x)=(x-1)^2-23$

C) $h(x)=(x-1)^2-25$

D) $h(x)=x^2-23$

11

x	2	4	6
$f(x)$	11	17	23

The table above shows some values of the linear function f. Which of the following defines f ?

A) $2x-5$

B) $2x+5$

C) $3x-5$

D) $3x+5$

12

In the equation $y=x^2-m$ and m is a positive constant the graph of the equation is a parabola. Which of the followingt is an equivalent form of the equation?

A) $y=(x-m)(x+m)$

B) $y=\left(x-\sqrt{m}\right)\left(x+\sqrt{m}\right)$

C) $y=(x-m)^2-m$

D) $y=\left(x-\frac{m}{2}\right)\left(x+\frac{m}{2}\right)$

CONTINUE

13

In the $xy-$ plane, the point $(2,3)$ lies on the graph of the function g. If $g(x)=-x^2+t$, where t is a constant, what is the value of t?

A) -4
B) -1
C) 3
D) 7

14

x	1	4	5
$g(x)$	12	27	32
$h(x)$	18	24	26

The table above shows some values of the functions g and h and g. For which values of x is $g(x)=h(x)$?

A) -2
B) -1
C) 3
D) 6

15

x	1	4	6
$h(x)$	-2	13	33

The table above shows some values of the linear function h. Which of the following defines $h(3)$?

A) 5
B) 8
C) 9
D) 12

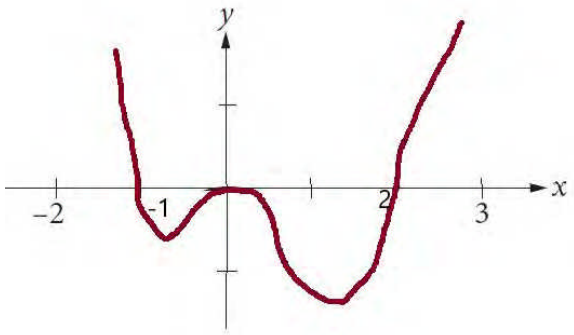
16

In the *xy-plane,* the graph $f(x)=2x^2-9x$ intersects the graph of the $y=-x$ at the points (0,0) and *(m,-m)*. What is the value of m?

A) 4
B) 6
C) 8
D) 9

CONTINUE

1



Which of the following could be equation of the graph above?

A) $y=(x-1)(x+1)(x-2)$

B) $y=x^2(x+1)(x-2)$

C) $y=x(x-1)(x+2)$

D) $y=x^2(x-1)(x+2)$

2

$$f(x)=3x-7$$

$$g(x)=\frac{4-f(x)}{3}$$

The functions f and g are defined above. What value of $g(3)$?

A) -2

B) $-\frac{2}{3}$

C) $\frac{2}{3}$

D) 3

3

$$h(x)=\frac{4}{x^2+x-12}$$

For what value of x is the function g above undefined?

A) -4

B) -3

C) 1

D) 4

4

$$f(x)=\frac{1}{2}(x+2)^2-6$$

$$g(x)=-x-8$$

The functions f and g are defined above. If $f(a)=g(a)$, what is possible value of a ?

A) -3

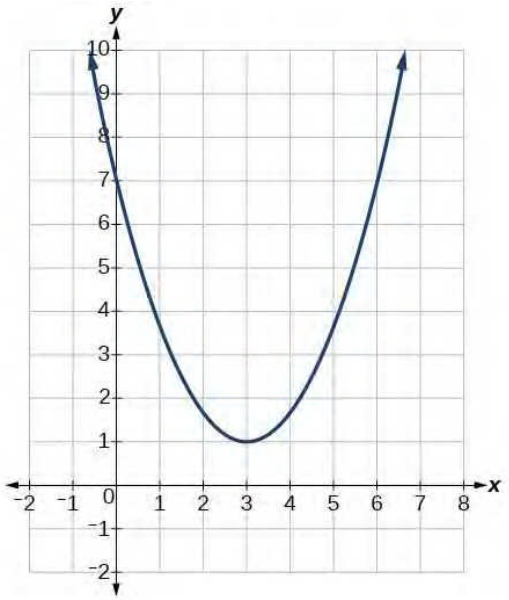
B) -2

C) 2

D) 4

CONTINUE

5



The graph above shows f in the $xy-planes$. Which of the following defines f ?

A) $y=\frac{1}{3}x^2+4x+7$

B) $y=-\frac{2}{3}x^2+4x+7$

C) $y=\frac{2}{3}x^2-4x+7$

D) $y=\frac{2}{3}x^2+4x+7$

6

If $f(x)=3x^2+3$ and $f(x-a)=3x^2-12x+15$, what is the value of a ?

A) -3

B) -1

C) 1

D) 2

7

In the $xy-plane$, the graph of the polynomial function g crosses the $x-axis$ at exactly two points, $(m,0)$ and $(n,0)$, where m and n are both negative. Which of the following could define g ?

A) $g(x)=(x+m)(x+n)$

B) $g(x)=(x-m)(x-n)$

C) $g(x)=(x-m)(x+n)$

D) $g(x)=(x+m)(x-n)$

8

If $f(x)=5x^2+7x+2$ is graphed in the $xy-plane$, which of the following characteristics of the graph is displayed as a constant or coefficient in the equation?

A) $y-$ intercept

B) $x-$ intercept(s)

C) $y-$ coordinate of the vertex

D) $x-$ intercept of the line of symmetry

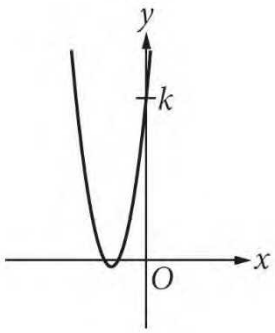
CONTINUE

9

In the $xy-plane$, the graph of function $h(x)=x^2+6x+8$ has two $x-$ intercepts. What is the distance between the $x-$ intercepts?

A) 4
B) 3
C) 2
D) 1

10



In the $xy-plane$, the graph of $g(x)=x^2+7x+11$ is shown above. If the function crosses the $y-axis$ at point $(0,k)$, what is the value of k?

A) 4
B) 7
C) 10
D) 11

11

If $f(x)=\frac{3x-5}{x+5}$, what is the value of $f(0)$?

A) -10
B) -5
C) -1
D) 1

12

If $f(x)=3^x-2^x$, what is the value of $f(3)-f(2)$?

A) 19
B) 14
C) 13
D) 11

CONTINUE

1

If $f(x)=\dfrac{3x^2+4x-1}{2x+3}$, what is $f(-2)$?

A) -6

B) -3

C) 3

D) 6

2

$$g(x)=x^2+6x+8$$

The graph of the g in the $xy-$plane is a parabola. Which of the following intervals contains the $x-$coordinate of the vertex of the graph of g ?

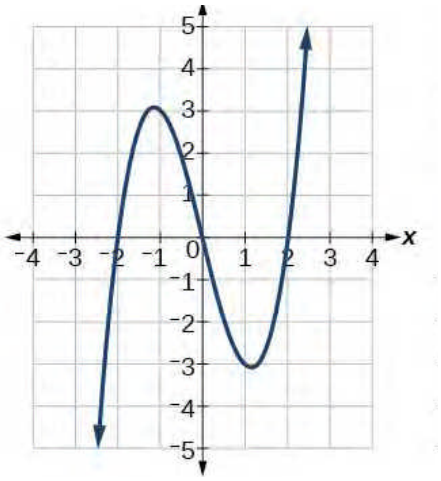
A) $-6<x<-5$

B) $-4<x<-2$

C) $-2<x<0$

D) $2<x<4$

3



Which of the following could be the equation of the graph above?

A) $y=(x-2)(x+2)$

B) $y=x^2(x-2)(x+2)$

C) $y=x(x-2)(x+2)$

D) $y=x(x-2)^2(x+2)$

4

$$f(x)=2x^2-3x$$
$$g(x)=5-2f(x)$$

The functions f and g are defined above. What is value of $g(-1)$?

A) -5

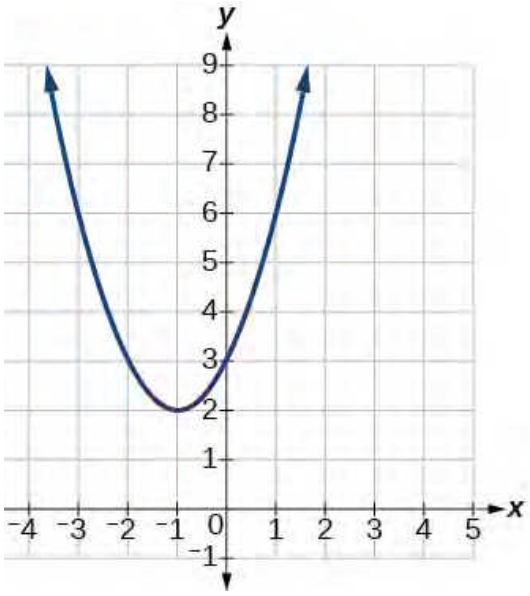
B) 1

C) 5

D) 15

CONTINUE

5



The graph above shows f in the $xy-planes$. Which of the following defines f ?

A) $y=3(x+1)^2+2$

B) $y=2(x+1)^2+3$

C) $y=(x+1)^2+2$

D) $y=(x+2)^2+3$

6

If $h(x)=x^2+2$ and $h(x+k)=x^2-6x+11$, what is the value of k ?

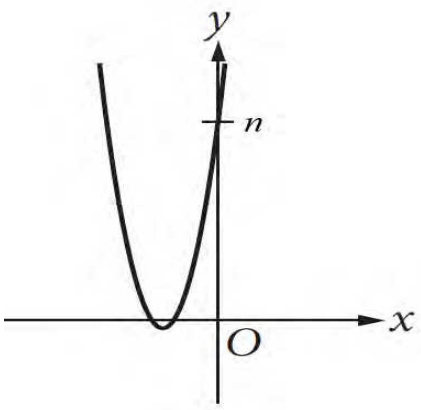
A) -3

B) -1

C) 0

D) 3

7



In the $xy-$plane, the graph of $g(x)=3x^2+11x+7$ is shown. If the graph crosses the $y-$ axis at point $(0,n)$, what is the value of n?

A) $-\frac{11}{6}$

B) 3

C) 6

D) 7

8

In the $xy-$plane, the graph of function $g(x)=x^2-x-6$ has two $x-$ intercepts. What is the distance between the $x-$ intercepts?

A) 6

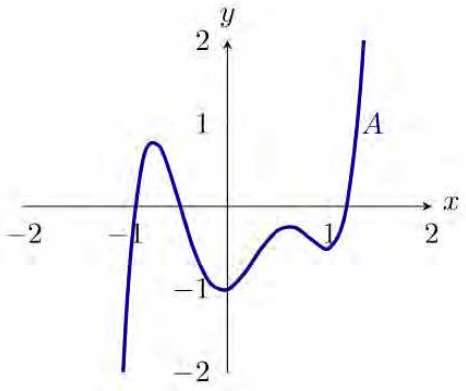
B) 5

C) 2

D) 1

CONTINUE

9



In the $xy-$ plane, the graph of f is shown above. Which of the following defines $f(0)$?

A) -1
B) 0
C) 1
D) 2

10

If $f(x)=6x-5$, what is the value of $f^{-1}(2)$?

A) $\frac{7}{6}$
B) $\frac{6}{7}$
C) $\frac{1}{7}$
D) 7

11

If $f(x)=\frac{3^{x+2}}{x+1}$, what is the value of $f(2)$?

A) 9
B) 18
C) 27
D) 81

12

If $f(x-3)=x^2+6x+11$ for all real values of x which of the following is equal to $f(x)$?

A) x^2-2
B) x^2-2
C) $(x+3)^2+2$
D) $(x+6)^2+2$

CONTINUE

1

If $f(x)= 5x+ k$, where k is a constant, and $f(-2) = -4$. What is value of k ?

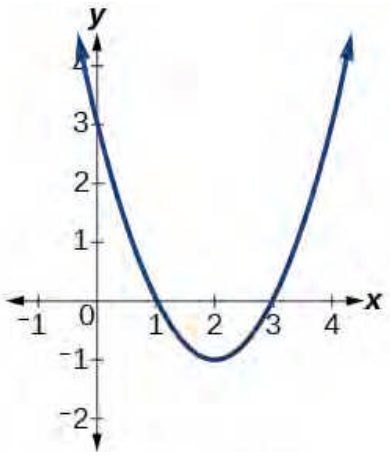
A) -6
B) -4
C) 4
D) 6

2

If $f(x)= 1- x^2$, and m is a positive real number, then $f\left(\frac{1}{m}\right)$?

A) $1+\frac{1}{m^2}$
B) $\frac{(m+1)(m+1)}{m^2}$
C) $\frac{(m-1)(m+1)}{m^2}$
D) $\frac{1-m^2}{m^2}$

3



Which of the following could be the equation of the graph above?

A) $f(x)= x^2 + 2x+ 3$
B) $f(x)= x^2 - 4x+ 3$
C) $f(x)= x^2 + 4x+ 3$
D) $f(x)= x^2 - 5x+ 3$

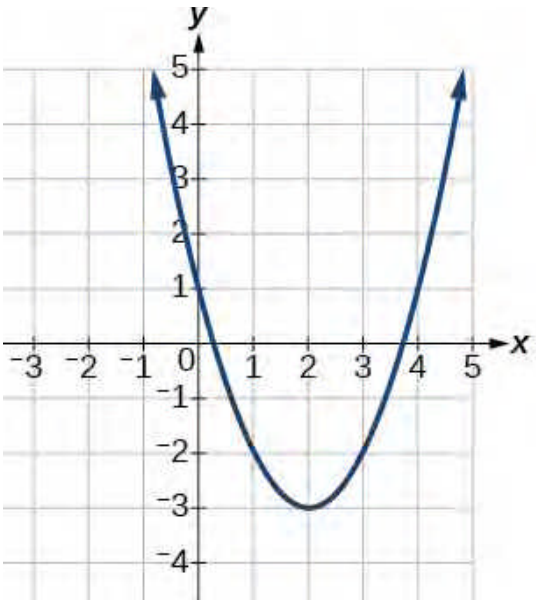
4

The functions f is defined by the equation $f(x)= x^2 - x$. Which of the following represents a quadratic equation with no real zeros?

A) $f(x)- 1$
B) $f\left(\frac{x}{2}\right)$
C) $f\left(\frac{2x-1}{2}\right)$
D) $f(x)+ 3$

CONTINUE

5



The graph above shows f in the xy- planes. Which of the following defines f ?

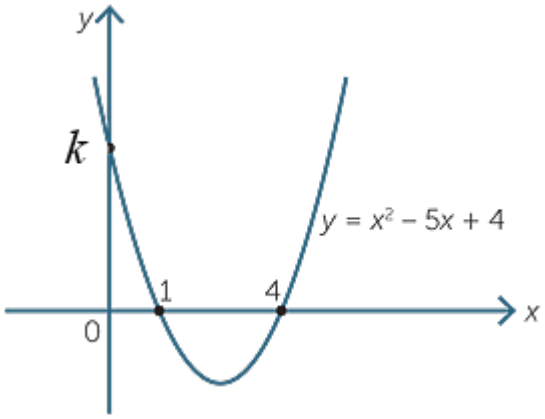
A) $y = x^2 - 4x + 1$

B) $y = \frac{1}{2}(x - 2)^2 - 3$

C) $y = 2(x - 2)^2 - \frac{3}{2}$

D) $y = 4(x - 2)^2 - 3$

6



In the xy- plane, the graph of $y = f(x)$ is shown. If the graph crosses the y- axis at point $(0,k)$, what is the value of k ?

A) $\frac{5}{2}$

B) 3

C) 4

D) 5

CONTINUE

7

If $f(x) = -x + 5$ and $g(f(x)) = 4x - 7$, what is value of $g(3)$?

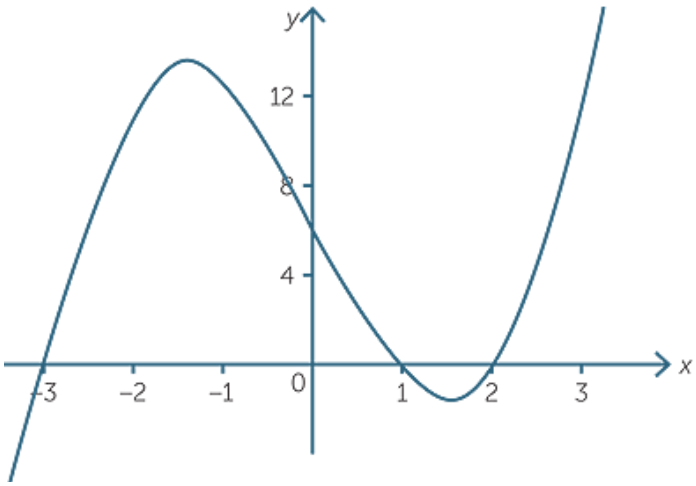
A) -7
B) -1
C) 1
D) 7

8

In the $xy-$ plane, the graph of function with zeros at $x = 3$ and $x = 5$ and vertex at $(4, -1)$. What is the $y-$ intercept of the graph?

A) -15
B) -8
C) 8
D) 15

9



In the $xy-$ plane, the graph of f is shown above. Which of the following defines $f(x)$?

A) $y = x^3 - 7x + 6$
B) $y = (x - 3)(x + 1)(x + 2)$
C) $y = x^2 - 2x + 1$
D) $y = x^3 - 6x + 7$

10

Let the function f be defined by $f(x) = 3 - |x - 5|$ for all real values of x. What is the greatest value of f?

A) -2
B) 3
C) 5
D) 8

CONTINUE

1

If $f(x) = x^2 - x$, what is the value of $f(-1) + f(1) + f(2)$?

A) 7
B) 6
C) 5
D) 4

2

If $g(x) = 3x + 2$, and $f(x) = x^2 + 2$, what is the value of $g(f(2))$?

A) 8
B) 12
C) 20
D) 24

3

If $f(x) = 3^{2x-1}$, and $f(2) = 5m + 2$, what is the value of m ?

A) 1
B) 3
C) 4
D) 5

4

If $f(2x - 5) = x^2 + 2x - 1$, what is the value of $f(5)$?

A) 36
B) 34
C) 25
D) -1

CONTINUE

5

$$f(x) = 3mx - 7$$

For the function f defined above, m is a constant and $f(2) = -13$. What is the value of $f(-2)$?

A) -1
B) 1
C) 13
D) 17

6

$$h(x) = \frac{1}{x^4 - 13x^2 + 36}$$

For what value of x is the function h above undefined?

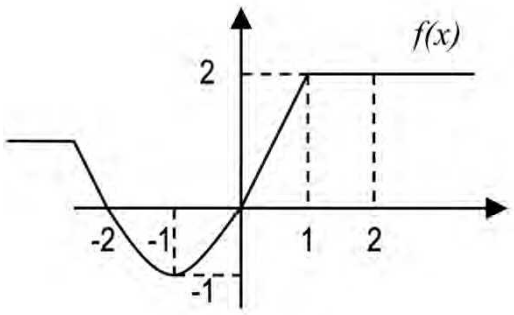
A) -9
B) -4
C) 3
D) 4

7

A function f satisfies $f(11) = 5, and\ f(3) = 1$.
A function g satisfies $g(5) = 11, and\ g(1) = 11$.
What is the value of $f(g(f(3)))$?

A) 11
B) 5
C) 3
D) 1

8

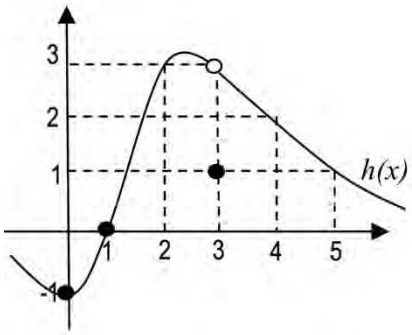


The graph of function $f(x)$ is shown above, what is the value of $\frac{f(-1)+f(2)}{f(-2)+f(1)}$?

A) -1
B) $-1/2$
C) 1/2
D) 1

CONTINUE

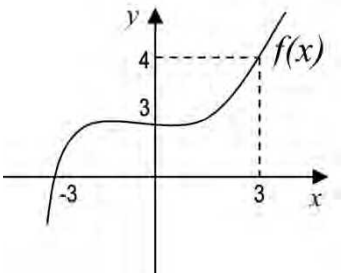
9



The graph of function $h(x)$ is shown above, what is the value of $\frac{h(0)+h(3)}{h(1)+h(4)}$?

A) -1
B) 0
C) 1
D) 3/2

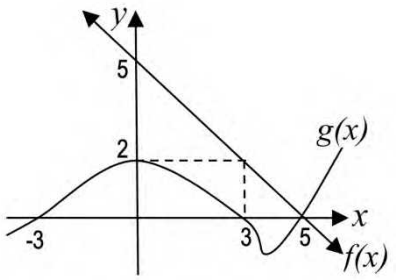
10



The graph of function $f(x)$ is shown above, what is the value of $f(f(0)) + f(-3)$?

A) -3
B) 0
C) 3
D) 4

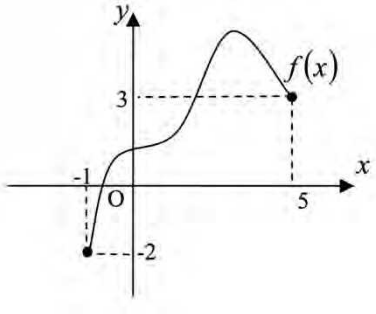
11



The graph of function $f(x)$, and $g(x)$ are shown above, what is the value of $g(f(0)) + f(3)$?

A) 2
B) 3
C) 5
D) 8

12



The graph of function $f(x)$ is shown above, what is the value of $f(5) - f(-1)$?

A) -5
B) -1
C) 1
D) 5

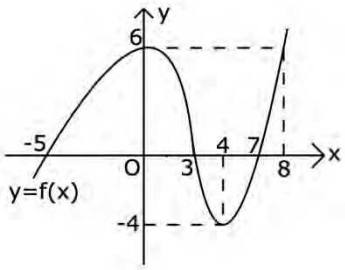
CONTINUE

13

If $f(x) = \sqrt{x+1}$, what is the value of $f(3) + f(15) - f(24)$?

A) -1
B) 1
C) 6
D) 11

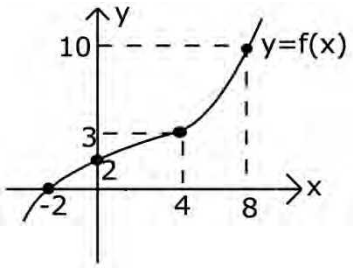
14



The graph of function $f(x)$ is shown above, and $f(f(-5)) + f(m) = 2$, what is the value of m?

A) 0
B) 3
C) 4
D) 8

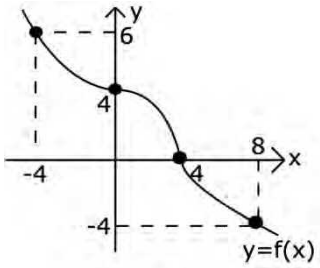
15



The graph of function $f(x)$ is shown above, and $g(x) = 2f(x-2) - 1$, what is the value of $g(f(8))$?

A) 19
B) 20
C) 21
D) 25

16



The graph of function $f(x)$ is shown above, and $f(4-n) + 6 = f(f(8))$, what is the value of n?

A) -2
B) -1
C) 0
D) 4

CONTINUE

1

In the $xy-plane$, $f(x)=(x-3)^2$ intersects the line with the equation $y=16$ at points A, and B. What is the length of $|AB|$?

A) 6
B) 7
C) 8
D) 11

2

In the $xy-plane$, graph of function f has $x-intercepts$ at $-1,\ 0, and\ 2$. Which of the following could define f?

A) $f(x)=x(x-1)(x+2)$
B) $f(x)=x(x+1)(x-2)$
C) $f(x)=x(x+1)^2(x+2)$
D) $f(x)=x(x-1)(x-2)$

3

$$f(x)=(x-2)(x+4)$$

Which of the following is an equivalent form of the function above in which the minimum value of f appears as a constant?

A) $f(x)=(x+1)^2+9$
B) $f(x)=(x+1)^2-9$
C) $f(x)=(x-1)^2-9$
D) $f(x)=(x-1)^2+9$

4

In the $xy-plane$, point $(1,4)$ lies on the graph of function f. If $f(x)=-2x^2+mx$, where m is constant. What is the value of m?

A) 1
B) 3
C) 4
D) 6

CONTINUE

5

In the $xy-plane$, the graph of function $f(x)=-x^2+x+12$, has two $x-intercepts$. What is the distance between the $x-intercepts$?

A) -7
B) 1
C) 4
D) 7

6

$$f(x)=-x^2-2x+15$$

The graph of the f in the $xy-plane$ is a parabola. Which of the following intervals contains the $x-coordinate$ of the vertex of the graph of f?

A) $-5<x<3$
B) $-3<x<5$
C) $-1<x<16$
D) $-3<x<-1$

7

In the $xy-plane$, the graph $f(x)=-x^2+4x$ intersects the graph of the $y=x$ at the points $(0,0), and\ (n,n)$. What is the value of n?

A) -4
B) -3
C) 3
D) 5

8

$$h(x)=x^2-x+1$$
$$g(x)=-30+2h(x)$$

The functions h and g are defined above. What is value of $g(-3)$?

A) -4
B) 4
C) 9
D) 13

CONTINUE

9

If $h(x) = x^2 - x$, *and* $h(x - t) = x^2 + 3x + 2$, what is the value of t ?

A) -2
B) 1
C) 2
D) 4

10

Let the function f be defined by $f(x) = 7 - 2|x - 3|$, for all real values of x. What is the greatest value of f?

A) 0
B) 4
C) 7
D) 13

11

If $f(x) = \frac{x^2-1}{x+1}$, what is the value of $\frac{f(-3)+f(3)}{f(0)}$?

A) -16
B) -2
C) 2
D) 4

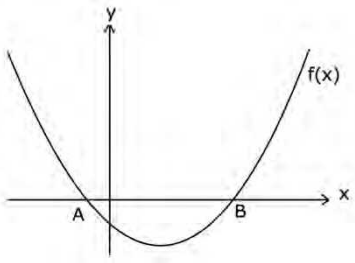
12

If $f(x) = \frac{3x-9}{x^2-3x}$, what is the value of $f(-1) + f(1)$?

A) -6
B) 0
C) 3
D) 6

CONTINUE

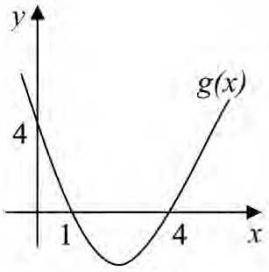
13



The graph of function $f(x)$ is shown above, $f(x) = x^2 - 2x + m$ intercepts at the points A, and B, and $|AB| = 4$, what is the value of m?

A) -3
B) -1
C) 1
D) 3

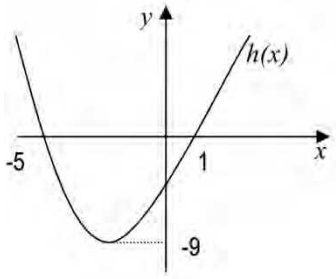
14



What is the equation of function shown above?

A) $g(x) = (x - 1)(x - 4)$
B) $g(x) = (x + 1)(x - 4)$
C) $g(x) = x^2 - 4x - 5$
D) $g(x) = 2x^2 + 4x + 5$

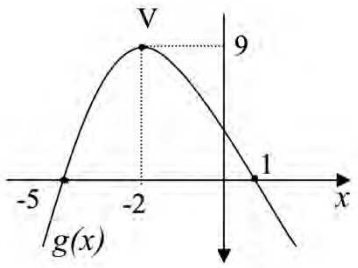
15



What is the equation of function shown above?

A) $h(x) = -x^2 - 4x - 5$
B) $h(x) = x^2 - 6x + 5$
C) $h(x) = (x - 1)(x + 5)$
D) $h(x) = x^2 - 3x + 6$

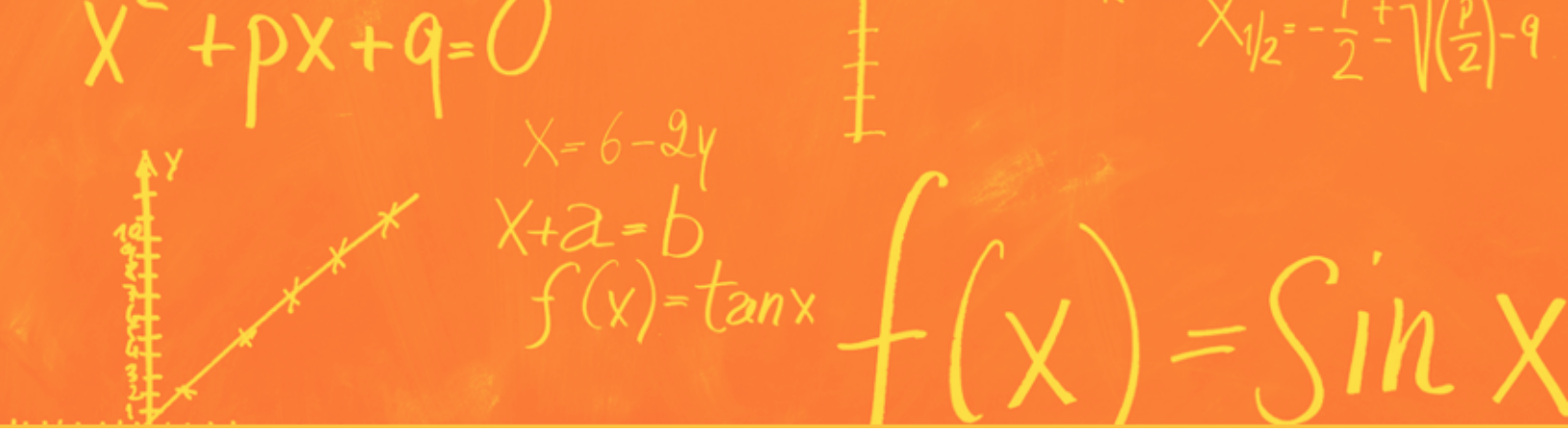
16



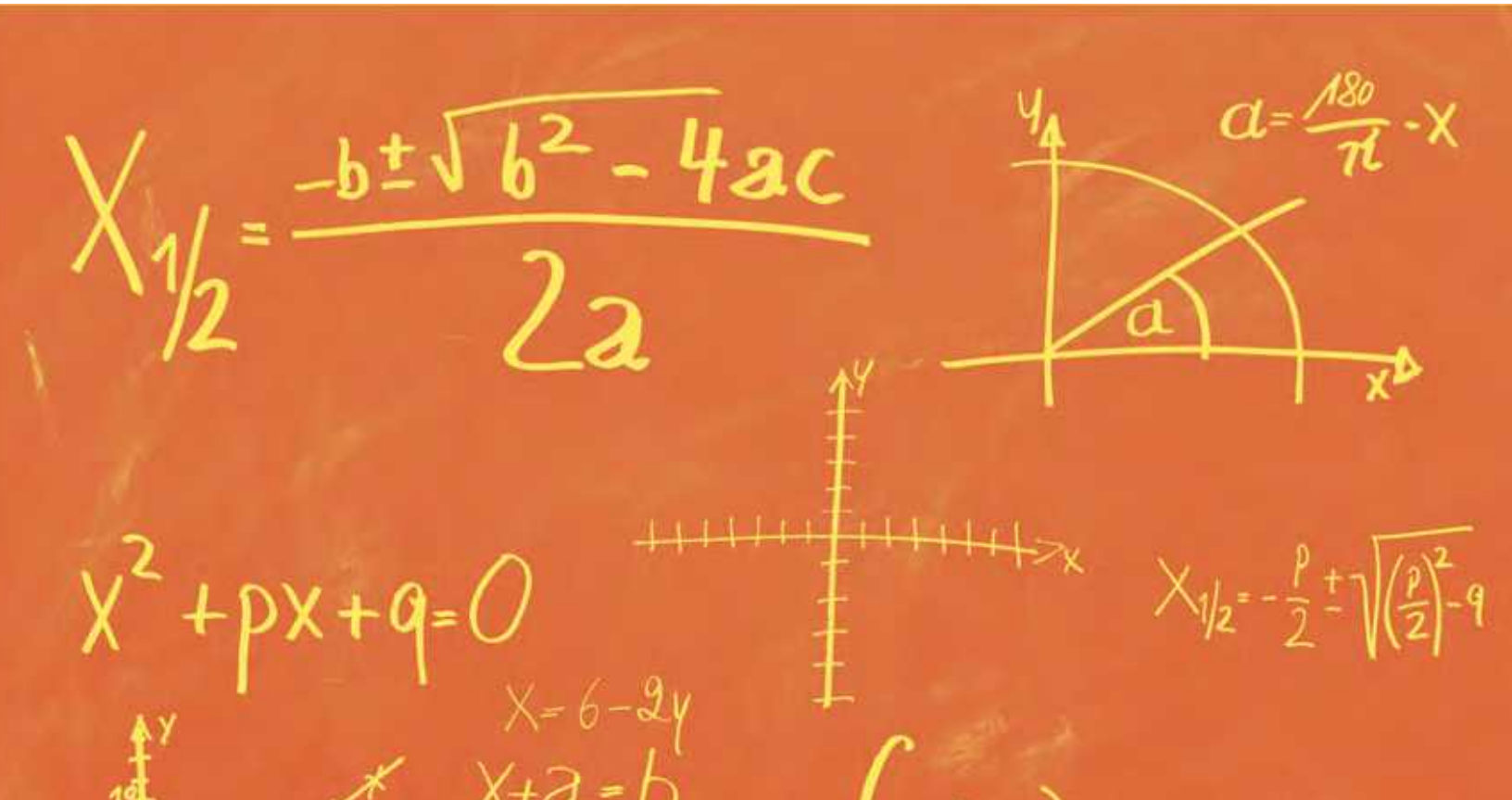
What is the equation of function shown above?

A) $g(x) = (x - 1)(x - 4)$
B) $g(x) = -x^2 - 4x - 5$
C) $g(x) = -x^2 - 4x + 3$
D) $g(x) = -x^2 - 4x + 5$

CONTINUE



SOLUTIONS



1

If $a = 4\sqrt{2}$ and $2a = \sqrt{4b}$, what is the value of b?

A) 8
B) 16
C) 32
D) 64

Solution:

$a = 4\sqrt{2} \Rightarrow 2a = \sqrt{4b}$

$(2)\,4\sqrt{2} = \sqrt{4b}$

$(8\sqrt{2})^2 = (\sqrt{4b})^2$

$64 \cdot 2 = 4b$

$128 = 4b$

$b = 32$

2

If $\frac{a^{x^2}}{a^{y^2}} = a^{54}$, $a > 1$ and $x - y = 6$, what is the value of $x + y$?

A) 3
B) 9
C) 24
D) 27

Solution:

$\frac{a^{x^2}}{a^{y^2}} = a^{54} \Rightarrow a^{x^2 - y^2} = a^{54}$

$x^2 - y^2 = 54 \Rightarrow x - y = 6$

$(x-y)(x+y) = 54$

$6(x+y) = 54$

$x + y = 9$

3

Which of the following is equal to $b^{\frac{2}{5}}$?

A) $\sqrt{b^{\frac{2}{5}}}$
B) $\sqrt{b^{\frac{5}{2}}}$
C) $\sqrt[2]{b^5}$
D) $\sqrt[5]{b^2}$

Solution:

$\sqrt[n]{x^m} = x^{\frac{m}{n}}$, using this formula

$b^{\frac{2}{5}} \Rightarrow \sqrt[5]{b^2}$

4

$\sqrt{m+3} - n = 0$

In the equation above, if $n = 6$, what is the value of m?

A) 3
B) 9
C) 27
D) 33

Solution:

$\sqrt{m+3} - n = 0$

$\sqrt{m+3} = n$

$(\sqrt{m+3})^2 = (6)^2$

$m + 3 = 36$

$m = 33$

CONTINUE

5

Which of the following is equal to $25^{\frac{3}{4}}$?

A) $\sqrt[3]{25}$

B) $5\sqrt{5}$

C) $\sqrt[4]{5}$

D) $\sqrt{5}$

Solution:

$25^{\frac{3}{4}} = (5^2)^{\frac{3}{4}} = 5^{2\cdot\frac{3}{4}_2}$

$5^{\frac{3}{2}}$; $\sqrt[n]{x^m} = x^{\frac{m}{n}}$

So ;

$\Rightarrow 5^{\frac{3}{2}} = \sqrt[2]{5^3}$

$= \sqrt{125}$

$= \sqrt{25\cdot 5}$

$= \boxed{5\sqrt{5}}$

6

If $\sqrt{x}+\sqrt{16}=\sqrt{25}$, what is the value of x?

A) 1

B) $\sqrt{9}$

C) 6

D) 9

Solution:

$\sqrt{x} + \sqrt{16} = \sqrt{25}$

$\sqrt{x} + 4 = 5$

$(\sqrt{x})^2 = (1)^2$

$\boxed{x = 1}$

7

Which of the following is equal to $\frac{a^{-3}\cdot b^{\frac{1}{2}}}{a^{-4}\cdot b}$?

A) $\frac{a}{2\sqrt{b}}$

B) $\frac{a}{\sqrt{b}}$

C) $\frac{1}{a^{-7}\sqrt{b}}$

D) $\frac{a\cdot b^2}{\sqrt{b}}$

Solution:

$\Rightarrow \frac{a^{-3}\cdot b^{\frac{1}{2}}}{a^{-4}\cdot b^1} = a^{-3-(-4)}\cdot b^{\frac{1}{2}-1}$

$\Rightarrow a^{-3+4} b^{-\frac{1}{2}} = a\, b^{\frac{-1}{2}}$

$= \frac{a}{b^{1/2}}$

$= \frac{a}{\sqrt{b}} = \boxed{\frac{a}{\sqrt{b}}}$

8

If $a^{-\frac{1}{3}} = m$, where $a > 0,$, what is the value of m?

A) $\frac{1}{\sqrt[3]{a}}$

B) $\sqrt[3]{a}$

C) $\sqrt[3]{a^2}$

D) $\sqrt[2]{a^{-3}}$

Solution:

$a^{-\frac{1}{3}} = m \quad ; \; a > 0$

$\frac{1}{a^{1/3}} = m$

$\boxed{\frac{1}{\sqrt[3]{a}} = m}$

CONTINUE

9

$$\sqrt{25a^2}$$

If $a>0$, which of the following is equivalent to the given expression?

A) $50a^4$
B) $10a$
C) $5a^2$
D) $5a$

Solution:

$\sqrt{25a^2} = \sqrt{5^2a^2}$

$= \sqrt{(5a)^2}$

$= |5a|$, since $a>0$

the answer is $5a$.

10

$$\sqrt{y^2} = y$$

Which of the following values of y is NOT solution to the equation above?

A) 2
B) 1
C) 0
D) -2

Solution:

$\sqrt{y^2} = y$

$\downarrow$

$|y| = y$

if $|y|=y$ then $y \geq 0$

so -2 is NOT a solution to the equation.

11

Which of the following is equivalent to $(4t)^{\frac{1}{3}}$?

A) $\sqrt[3]{4t}$
B) $2\sqrt[3]{t}$
C) $\frac{1}{12t^3}$
D) $(4t)^3$

Solution:

$(4t)^{\frac{1}{3}} \Rightarrow \sqrt[3]{4t}$

12

If $a^3 = \sqrt{\sqrt{b}}$, where $b>0$, what is the value of a in terms of b?

A) $b^{\frac{1}{7}}$
B) $b^{\frac{5}{12}}$
C) $b^{\frac{1}{12}}$
D) $b^{\frac{3}{4}}$

Solution:

$a^3 = \sqrt{\sqrt{b}}$; $b>0$

$a^3 = \sqrt[4]{b}$

$a^3 = b^{\frac{1}{4}} \Rightarrow (a^3)^{\frac{1}{3}} = (b^{\frac{1}{4}})^{\frac{1}{3}}$ { take a power of $\frac{1}{3}$ both sides

$a^{3\cdot\frac{1}{3}} = b^{\frac{1}{4}\cdot\frac{1}{3}}$

$a = b^{\frac{1}{12}}$

CONTINUE

13

Which of the following is equal to $\frac{1}{\sqrt{2}+1}$?

A) $\frac{\sqrt{2}}{2}-\frac{1}{2}$

B) $\sqrt{2}-1$

C) $\frac{\sqrt{2}}{2}+\frac{1}{2}$

D) $\sqrt{2}+1$

Solution:

$$\frac{1}{\sqrt{2}+1} = \frac{1(\sqrt{2}-1)}{(\sqrt{2}+1)(\sqrt{2}-1)}$$

$$= \frac{\sqrt{2}-1}{2-1}$$

$$= \frac{\sqrt{2}-1}{1}$$

$$\Rightarrow \boxed{\sqrt{2}-1}$$

14

If $x^3=30$, and $y^2=10$, what is the value of $(x\cdot y)^6$?

A) 3×10^4

B) 9×10^4

C) 3×10^5

D) 9×10^5

Solution:

$$x^3=30,\ y^2=10 \Rightarrow (xy)^6 = x^6\cdot y^6$$

$$= (x^3)^2(y^2)^3 = 30^2\cdot 10^3$$

$$= 900\cdot 10^3$$

$$= 9\cdot 10^2\cdot 10^3$$

$$= \boxed{9\times10^5}$$

15

If y is positive integer and $x=2^{y+3}+2^y$, what is 2^{y+2} in terms of x?

A) $\frac{x}{9}$

B) $\frac{4x}{9}$

C) $13x$

D) $36x$

Solution:

$$x = 2^{y+3}+2^y$$

$$x = 2^3\cdot 2^y + 2^y$$

$$x = 2^y(8+1)$$

$$2^y = \frac{x}{9}$$

$$2^{y+2} = 2^y\cdot 2^2$$

$$= 2^y\cdot 4$$

$$= \frac{x}{9}\cdot 4$$

$$= \boxed{\frac{4x}{9}}$$

16

What is the value of $5\sqrt{8}+6\sqrt{32}$?

A) $10\sqrt{2}$

B) $11\sqrt{40}$

C) $34\sqrt{2}$

D) $36\sqrt{2}$

Solution:

$$5\sqrt{8} + 6\sqrt{32}$$

$$= 5\sqrt{4\cdot2} + 6\sqrt{16\cdot2}$$

$$= 5\cdot2\sqrt{2} + 6\cdot4\sqrt{2}$$

$$= 10\sqrt{2} + 24\sqrt{2}$$

$$= 34\sqrt{2}$$

CONTINUE

1

What is the value of $4\sqrt{50}-3\sqrt{32}$?

A) $8\sqrt{2}$

B) $12\sqrt{40}$

C) $20\sqrt{2}$

D) $32\sqrt{2}$

Solution:

$4\sqrt{50} - 3\sqrt{32}$

$= 4\sqrt{25\cdot 2} - 3\sqrt{16\cdot 2}$

$= 4\cdot 5\sqrt{2} - 3\cdot 4\sqrt{2}$

$= 20\sqrt{2} - 12\sqrt{2}$

$\Rightarrow 8\sqrt{2}$

2

If $16b = 2^{a+5}$, what is the value of b?

A) $32\cdot 2^a$

B) 2^{a+2}

C) $2\cdot 2^{a+2}$

D) 2^{a+1}

Solution:

$16b = 2^{a+5}$

$2^4 b = 2^{a+5}$

$b = \frac{2^{a+5}}{2^4}$

$b = 2^{a+1}$

3

What is the value of $\frac{9\sqrt{24}}{4\sqrt{27}}$?

A) $3\sqrt{2}$

B) $\frac{3\sqrt{2}}{2}$

C) $2\sqrt{2}$

D) $\frac{2\sqrt{2}}{3}$

Solution:

$\frac{9\sqrt{24}}{4\sqrt{27}} = \frac{9\sqrt{4\cdot 6}}{4\sqrt{9\cdot 3}} = \frac{9\cdot 2\sqrt{6}}{4\cdot 3\sqrt{3}}$

$\Rightarrow \frac{18}{12}\cdot\sqrt{\frac{6}{3}} = \frac{3}{2}\sqrt{2} = \frac{3\sqrt{2}}{2}$

4

$$\sqrt{-x} - y = 5$$

In the equation above, if $y = 2$, what is the value of x?

A) -49

B) -27

C) 27

D) 49

Solution:

$\sqrt{-x} - y = 5 \quad ; \quad y = 2$

$\sqrt{-x} - 2 = 5$

$(\sqrt{-x})^2 = (7)^2$

$-x = 49$

$x = -49$

CONTINUE

5

Which of the following is equal to $\frac{25^{4x}}{125^{3x}}$?

A) $\frac{1}{5}$

B) $\frac{1}{5^x}$

C) 5

D) 5^x

Solution:

$$\frac{25^{4x}}{125^{3x}} = \frac{(5^2)^{4x}}{(5^3)^{3x}} = \frac{5^{8x}}{5^{9x}}$$

$$= 5^{8x-9x} = 5^{-x} = \frac{1}{5^x}$$

6

If $8^{12} = 4^x$, what is the value of x?

A) 9

B) 12

C) 18

D) 36

Solution:

$$8^{12} = 4^x$$

$$(2^3)^{12} = (2^2)^x$$

$2^{36} = 2^{2x}$, since the bases are equal

$$\Rightarrow 36 = 2x$$

$$x = 18$$

7

Which of the following is equivalent to $\frac{(a+a+a+a)\cdot(a+a)}{4^{-1}}$?

A) $16\cdot a$

B) $32\cdot a$

C) $16\cdot a^2$

D) $32\cdot a^2$

Solution:

$$= \frac{4a\cdot 2a}{4^{-1}}$$

$$= \frac{8a^2}{\frac{1}{4}}$$

$$= 4\cdot 8a^2$$

$$= 32a^2$$

8

Which of the following is equivalent to $\frac{\sqrt{32}+4\sqrt{18}}{\sqrt{8}}$?

A) 2

B) $2\sqrt{2}$

C) 8

D) $8\sqrt{2}$

Solution:

$$= \frac{\sqrt{32}+4\sqrt{8}}{\sqrt{8}} \Rightarrow \frac{\sqrt{16\cdot 2}+4\sqrt{9\cdot 2}}{\sqrt{4\cdot 2}}$$

$$\Rightarrow \frac{4\sqrt{2}+12\sqrt{2}}{2\sqrt{2}}$$

$$\Rightarrow \frac{16\sqrt{2}}{2\sqrt{2}} = 8$$

CONTINUE

9

If $a^2=9$, $b^2=16$, and $(a+3)\cdot(b-4)\neq 0$ what is the value of $a+b$?

A) -2
B) -1
C) 1
D) 2

Solution:

$a^2=9$ | $b^2=16$

$a=3$ or $a=-3$ | $b=-4$ or $b=4$

$(a+3)(b-4)\neq 0$

$a\neq -3$ and $b\neq 4$

so $a=3$ and $b=-4$

$a+b=3+(-4)=\boxed{-1}$

10

If $\frac{1}{x-2}=\sqrt{2}$ what is the value x?

A) $\frac{\sqrt{2}+4}{2}$
B) $\frac{\sqrt{2}-4}{2}$
C) $\frac{\sqrt{2}-2}{2}$
D) $\frac{\sqrt{2}+2}{2}$

Solution:

$\frac{1}{x-2}=\sqrt{2}$

$x-2=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$

$x-2=\frac{\sqrt{2}}{2}$

$x=\frac{\sqrt{2}}{2}+2 \Rightarrow \boxed{\frac{\sqrt{2}+4}{2}}$

11

If $\frac{1}{3^x}=3\sqrt{3}$ what is the value x?

A) $-\frac{3}{2}$
B) $-\frac{2}{3}$
C) $\frac{2}{3}$
D) $\frac{3}{2}$

Solution:

$\frac{1}{3^x}=3\sqrt{3} \Rightarrow 3^{-x}=3^1\cdot 3^{\frac{1}{2}}$

$3^{-x}=3^1\cdot 3^{\frac{1}{2}}=3^{\frac{3}{2}}$

$-x=3/2$

$\boxed{x=-\frac{3}{2}}$

12

If $(3{,}000)\cdot(4{,}000)=1.2\times 10^m$ what is the value m?

A) 6
B) 7
C) 8
D) 9

Solution:

$3000\cdot 4000=1.2\times 10^m$

$(3\times 10^3)(4\times 10^3)=1.2\times 10^m$

$12\times 10^6=1.2\times 10^m$

$1.2\times 10^{\textcircled{7}}=1.2\times 10^{\textcircled{m}}$

$\boxed{m=7}$

CONTINUE

13

If $2^a = 5$ what is the value $5 \cdot 4^a + 2^a$?

A) 55
B) 80
C) 125
D) 130

Solution:

$2^a = 5 \Rightarrow 5 \cdot 4^a + 2^a$
$= 5 \cdot 2^{2a} + 2^a$
$= 5 (2^a)^2 + 2^a$
$= 5 (5)^2 + 5$
$= 125 + 5$
$= 130$

14

If $\left(3+2\sqrt{2}\right)^2 = a + b\sqrt{2}$, where a and b are integers, what is the value of $a+b$?

A) 17
B) 23
C) 29
D) 37

Solution:

$(3+2\sqrt{2})^2 = a + b\sqrt{2}$
$9 + 12\sqrt{2} + 8 = a + b\sqrt{2}$
$17 + 12\sqrt{2} = a + b\sqrt{2}$
$a = 17$ and $b = 12$
$a+b \Rightarrow 17+12$
$= 29$

15

If $\frac{x}{4+\sqrt{7}} = \frac{4-\sqrt{7}}{y}$, what is the value of $(xy)^{\frac{3}{2}}$?

A) 9
B) 27
C) 54
D) 81

Solution:

$x \cdot y = (4+\sqrt{7}) \cdot (4-\sqrt{7})$
$x \cdot y = 4^2 - 7 = 9$
$(xy)^{3/2} \Rightarrow 9^{\frac{3}{2}} \Rightarrow 3^{2 \cdot \frac{3}{2}} = 3^3$
$= 27$

16

If $4^x = 25$, what is the value of 2^{x-2} ?

A) $\frac{5}{4}$
B) $\frac{5}{2}$
C) 5
D) 50

Solution:

$4^x = 25$
$2^{2x} = 5^2 \Rightarrow 2^x = 5$
$2^{2x-2} = \frac{2^x}{2^2}$
$= \frac{5}{4}$

CONTINUE

1

If $f(a,b)=\frac{2a}{b^2}$, where a and b are positive integers, what is the value of $\frac{f(2a,4b)}{f(a,3b)}$?

A) $\frac{9}{16}$

B) $\frac{9}{8}$

C) $\frac{9}{4}$

D) $\frac{9}{2}$

Solution:

$f(a,b)=\frac{2a}{b^2}$

$=\frac{f(2a,4b)}{f(a,3b)}$

$=\frac{\frac{2\cdot 2a}{(4b)^2}}{\frac{2\cdot a}{(3b)^2}} \Rightarrow \frac{\frac{4a}{16b^2}}{\frac{2a}{9b^2}} = \frac{4a}{16b^2}\cdot\frac{9b^2}{2a} = \frac{9}{8}$

2

If a is positive integer, and $3^a=b$, which of the following express $3b^2$ in terms of a?

A) $3\cdot 3^a$

B) 3^{2a}

C) 3^{a+2}

D) 3^{2a+1}

Solution:

$3^a=b \Rightarrow 3b^2=?$

$3b^2=3(3^a)^2$

$=3(3^{2a})$

$=3^{2a+1}$

3

What is the smallest integer value of x such that $10^{-x}<0.000036$?

A) 4

B) 5

C) 6

D) 7

Solution:

$10^{-x}<\frac{36}{10^6}=36\cdot 10^{-6}$

$x=5$

4

If $\frac{2}{2^{-m}}=4\sqrt{8}$, what is the value of m?

A) $\frac{5}{2}$

B) 3

C) $\frac{7}{2}$

D) $\frac{9}{2}$

Solution:

$\frac{2}{2^{-m}}=4\sqrt{8}=4\sqrt{2^3}$

$2^{1+m}=2^2\cdot 2^{3/2}=2^{7/2}$

$1+m=\frac{7}{2}$

$m=\frac{5}{2}$

CONTINUE

5

If $4\sqrt{50}-3\sqrt{8}=n\sqrt{2}$, what is the value of n?

A) 6
B) 12
C) 14
D) 20

Solution:

$4\sqrt{50}-3\sqrt{8}=n\sqrt{2}$

$4\sqrt{25\cdot 2}-3\sqrt{4\cdot 2}=n\sqrt{2}$

$4\cdot 5\sqrt{2}-3\cdot 2\sqrt{2}=n\sqrt{2}$

$20\sqrt{2}-6\sqrt{2}=n\sqrt{2}$

$n=14$

6

If $8^{12}=4^{x}$, what is the value of x?

A) 9
B) 12
C) 15
D) 18

Solution:

$8^{12}=4^{x}$

$(2^3)^{12}=4^{x}$

$2^{36}=2^{2x}$

$36=2x$

$x=18$

7

Which of the following is equivalent to $\dfrac{2}{3^{-1}\cdot(a+a+a)\cdot(a+a)}$?

A) $\frac{1}{a}$
B) $\frac{1}{a^2}$
C) a
D) a^2

Solution:

$\dfrac{2}{\frac{1}{3}\cdot 3a\cdot 2a}=\dfrac{1}{a^2}$

8

Which of the following is equivalent to $\dfrac{7x\sqrt{3y}+x\sqrt{27y}}{2x\sqrt{3}}$?

A) $\sqrt{y}$
B) $5x\sqrt{y}$
C) $5\sqrt{y}$
D) $5\sqrt{3y}$

Solution:

$\Rightarrow \dfrac{7x\sqrt{3y}+x\sqrt{27y}}{2x\sqrt{3}}=\dfrac{7x\sqrt{3y}+x\sqrt{9\cdot 3y}}{2x\sqrt{3}}$

$=\dfrac{7x\sqrt{3y}+3x\sqrt{3y}}{2x\sqrt{3}}=\dfrac{10x\sqrt{3y}}{2x\sqrt{3}}$

$=5\sqrt{y}$

CONTINUE

9

If $2x-y=5$ what is the value of $\frac{4^x}{2^y}$?

A) 8
B) 16
C) 32
D) 64

Solution:

$2x-y=5$

$\frac{4^x}{2^y}=\frac{2^{2x}}{2^y}=2^{2x-y} \Rightarrow 2^5$

$\Rightarrow 32$

10

If $x^{-\frac{1}{3}}=2$ what is the value x?

A) -8
B) $\frac{1}{8}$
C) $-\frac{1}{8}$
D) 8

Solution:

$\left(x^{\frac{-1}{3}}\right)^{-3}=(2)^{-3}$

$x=2^{-3}=\frac{1}{2^3}$

$x=\frac{1}{8}$

11

If $m=1^1+1^3+1^5+\ldots+1^{99}$ what is the value m?

A) 25
B) 49
C) 50
D) 99

Solution:

$m=\underbrace{1+1+1+\ldots+1}_{50 \text{ times}}$

$m=50$

12

If $4^{3x-2}=\frac{1}{8^{x+5}}$ what is the value x?

A) -11
B) -9
C) $\frac{11}{9}$
D) $-\frac{11}{9}$

Solution:

$4^{3x-2}=\frac{1}{8^{x+5}}=8^{-(x+5)}$

$2^{2(3x-2)}=2^{-3(x+5)}$

$6x-4=-3x-15$

$9x=-11$

$x=\frac{-11}{9}$

CONTINUE

13

If $3^{y+1}=10$ what is the value 3^{y-2}?

A) $\frac{3}{10}$

B) $\frac{10}{3}$

C) $\frac{10}{27}$

D) $\frac{27}{10}$

Solution:

$3^y \cdot 3 = 10 \Rightarrow 3^y = \frac{10}{3}$

$3^{y-2} = \frac{3^y}{3^2} = \frac{\frac{10}{3}}{9} = \boxed{\frac{10}{27}}$

14

If $a^2b^3=64$, and $a^3b^2=16$ what is the value $a \cdot b$?

A) 2

B) 4

C) 5

D) 10

Solution:

$a^2b^3 = 64 = 2^6$

$+\quad a^3b^2 = 16 = 2^4$

$a^5b^5 = 2^6 \cdot 2^4$

$ab^5 = 2^{10} = (2^2)^5$

$ab = 2^2$

$= \boxed{4}$

15

If $x\sqrt{x\sqrt{x}} = x^m$, what is the value of m?

A) $\frac{7}{4}$

B) $\frac{3}{4}$

C) $\frac{3}{2}$

D) 1

Solution:

$x\sqrt{x\sqrt{x}} = x^m$

$\sqrt{x^2 \cdot x\sqrt{x}} = \sqrt{x^3\sqrt{x}} = \sqrt{\sqrt{x^6 x}} = \sqrt{\sqrt{x^7}}$

$= \sqrt[4]{x^7} = x^m$

$x^{7/4} = x^m$

$\boxed{m = 7/4}$

16

If $5\sqrt{x+3} = 4\sqrt{5}$, what is the value of x?

A) $-\frac{1}{5}$

B) $\frac{1}{5}$

C) 5

D) 10

Solution:

$(5\sqrt{x+3})^2 = (4\sqrt{5})^2$

$25(x+3) = 16 \cdot 5$

$25x + 75 = 80$

$25x = 5$

$\boxed{x = \frac{1}{5}}$

CONTINUE

1

$$\frac{2^{n+10}}{2^n}\cdot\frac{3^{2m}}{3^{2m-10}}$$

Assuming n is nonzero, which of the following expressions is equivalent to the expression above?

A) 2^{10}
B) 3^{10}
C) 6^{10}
D) 6^{20}

Solution:

$$\frac{2^{n+10}}{2^n}\cdot\frac{3^{2m}}{3^{2m-10}} = 2^{n+10-n}\cdot 3^{2m-2m+10}$$
$$= 2^{10}\cdot 3^{10}$$
$$= \boxed{6^{10}}$$

2

If $\left(x^{a+b}\right)^{a-b}=x^{64}$, and $a+b=16$, what is the value of $a-b$?

A) 4
B) 8
C) 12
D) 16

Solution:

$$\left(x^{a+b}\right)^{a-b} = x^{64}$$
$$x^{(a+b)(a-b)} = x^{64}$$
$$(a+b)(a-b) = 64$$
$$16(a-b) = 64$$
$$\boxed{a-b=4}$$

3

If $3^x\times 3^y=81^m$, and $\frac{3^x}{3^y}=9^{m-1}$, what is the value of x in terms of m?

A) $6m-3$
B) $6m-2$
C) $3m-2$
D) $3m-1$

Solution:

$$3^x 3^y = 81^m \Rightarrow 3^{x+y} = 3^{4m} \Rightarrow x+y=4m$$
$$\frac{3^x}{3^y} = 9^{m-1} \Rightarrow 3^{x-y} = 3^{2m-2} \Rightarrow x-y=2m-2$$

$$\begin{array}{r} x+y=4m \\ +\ x-y=2m-2 \\ \hline 2x=6m-2 \end{array}$$

$$x=\frac{6m-2}{2} \Rightarrow \boxed{x=3m-1}$$

4

If $6\sqrt[3]{x}+13=43$, what is the value of x?

A) 5
B) 25
C) 100
D) 125

Solution:

$$6\sqrt[3]{x} = 43-13$$
$$= 30$$
$$\sqrt[3]{x} = 5$$
$$\boxed{x=125}$$

CONTINUE

5

If $a = 3\sqrt{2}$ and $2a = \sqrt{3x}$, what is the value of x?

A) 6
B) 12
C) 24
D) 36

Solution:

$a = 3\sqrt{2} \Rightarrow 2a = 6\sqrt{2}$

$2a = \sqrt{3x}$

$(6\sqrt{2})^2 = (\sqrt{3x})^2$

$x = 24$

6

If $\sqrt[3]{y^2 + 4} = 5$, what is the value of y?

A) -9
B) -11
C) -12
D) -121

Solution:

$\left(\sqrt[3]{y^2+4}\right)^3 = (5)^3$

$y^2 + 4 = 125$

$y^2 = 121$

$y = \mp 11$

7

Which of the following is equivalent to $\frac{(4 \cdot x^2 \cdot y^3)^3}{(2 \cdot x \cdot y^2)^4} \cdot \frac{(8 \cdot x^3 \cdot y)}{(2 \cdot x \cdot y)^2}$?

A) $\frac{x^2}{2}$
B) $\frac{x^3}{4}$
C) $2x^2$
D) $8x^3$

Solution:

$\frac{4^3 x^6 y^9}{2^4 x^4 y^8} \cdot \frac{8 x^3 y}{2^2 x^2 y^2} = \frac{2^6 x^9 y^{10} 2^3}{2^6 x^6 y^{10}}$

$= x^3 \cdot 2^3$

$= 8x^3$

8

Which of the following is equivalent to $\frac{(-1)^9 \cdot (-1)^{10} + (-1)^{21}}{(-1)^{11} \cdot (-1)^8}$?

A) –2
B) –1
C) 1
D) 2

Solution:

$= \frac{(-1)(1) + (-1)}{(-1)(1)} = \frac{-2}{-1} = 2$

CONTINUE

9

If $2^t \cdot 4^3 = 8^s$ what is the value of s in terms of t?

A) $t+6$

B) $\frac{t+6}{3}$

C) $t-6$

D) $\frac{t-6}{3}$

Solution:

$2^t \cdot 2^6 = 2^{3s}$

$2^{t+6} = 2^{3s}$

$t+6 = 3s$

$s = \frac{t+6}{3}$

10

If $4^{x+3} = 16^{2x}$ what is the value x?

A) 1

B) 2

C) 4

D) 8

Solution:

$(2^2)^{x+3} = (2^4)^{2x}$

$2^{2x+6} = 2^{8x}$

$2x+6 = 8x$

$6 = 6x$

$x = 1$

11

What is the value $\left(\sqrt{\frac{1}{3}+\frac{1}{6}}\right) \cdot \sqrt{8}$?

A) 1

B) $\sqrt{2}$

C) 2

D) 4

Solution:

$\sqrt{\frac{1}{3}+\frac{1}{6}} \cdot \sqrt{8}$

$= \sqrt{\frac{2+1}{6}} \cdot \sqrt{8}$

$= \sqrt{\frac{3}{6}} \cdot \sqrt{8}$

$= \frac{1}{\sqrt{2}} \cdot \sqrt{8}$

$= \sqrt{\frac{8}{2}} \Rightarrow \sqrt{4} = 2$

12

If $\sqrt[3]{3x^2-11} = 4$ what is the value x?

A) 3

B) 5

C) 8

D) 16

Solution:

$\left(\sqrt[3]{3x^2-11}\right)^3 = (4)^3$

$3x^2 - 11 = 64$

$3x^2 = 75$

$x^2 = 25$

$x = \pm 5$

$x = 5$

CONTINUE

13

What is the value $\sqrt{21+\sqrt{13+\sqrt{6+\sqrt{9}}}}$?

A) 4
B) 5
C) 6
D) 7

Solution:

$\sqrt{21+\sqrt{13+\sqrt{6+\sqrt{9}}}}$

$\sqrt{6+3} = \sqrt{9}$

$\sqrt{13+3} = \sqrt{16}$

$\sqrt{21+4} = \sqrt{25}$

$= 5$

14

What is the value $\sqrt{\sqrt{13}+2}\cdot\sqrt{\sqrt{13}-2}$?

A) 3
B) 9
C) 13
D) 15

Solution:

$= \sqrt{(\sqrt{13}+2)(\sqrt{13}-2)}$

$= \sqrt{\sqrt{13}^2 - 2^2}$

$= \sqrt{13-4}$

$= \sqrt{9}$

$= 3$

15

What is the value $\sqrt{0.04}+\sqrt{0.09}+\sqrt{0.25}$?

A) $\sqrt{10}$
B) $\sqrt{2}$
C) $\frac{\sqrt{10}}{10}$
D) 1

Solution:

$0.2 + 0.3 + 0.5 = 1$

16

What is the value $\frac{5\sqrt{3}}{\sqrt{27}}\cdot\frac{\sqrt{45}}{\sqrt{12}}\cdot\frac{\sqrt{5}}{\sqrt{108}}$?

A) $\frac{7}{9}$
B) $\frac{20}{3}$
C) $\frac{25}{36}$
D) $\frac{18}{25}$

Solution:

$\frac{5\sqrt{3}}{3\sqrt{3}}\cdot\frac{3\sqrt{5}}{2\sqrt{3}}\cdot\frac{\sqrt{5}}{6\sqrt{3}} \Rightarrow \frac{5\cdot5}{2\cdot6\cdot3}$

$= \frac{25}{36}$

CONTINUE

1

Which of the following is equivalent to $\dfrac{1}{\dfrac{1}{x-2}-\dfrac{1}{x-3}}$?

A) $\dfrac{x^2-5x+6}{x+1}$

B) $-x^2+5x-6$

C) $\dfrac{x+1}{x^2-5x+6}$

D) $\dfrac{x-1}{x^2-5x+6}$

Solution:

$= \dfrac{1}{\dfrac{x-3-(x-2)}{(x-3)(x-2)}} = \dfrac{x^2-5x+6}{x-3-x+2}$

$= \dfrac{x^2-5x+6}{-1} \Rightarrow -x^2+5x-6$

2

For a polynomial $P(x)$, the value of $P(-2)$ is 3. Which of the following must be true about $P(x)$?

A) $x-2$ is a factor of $P(x)$

B) $x+2$ is a factor of $P(x)$

C) $x+3$ is a factor of $P(x)$

D) The remainder when $P(x)$ is divided by $x+2$ is 3.

Solution:

$P(-2) = 3$

This means the remainder is 3 when $P(x)$ divide by $x+2$.

3

Which of the following is equivalent to $9x^4-12x^2y^2+4y^4$?

A) $(3x-2y)^4$

B) $(3x^2-2y^2)^2$

C) $(9x^2-4y^2)^2$

D) $(9x-4y)^4$

Solution:

$9x^4 - 12x^2y^2 + 4y^4$

$(3x^2)^2 - 2\cdot 3x^2\cdot 2y^2 + (2y^2)^2$

$(3x^2-2y^2)^2$

4

Which of the following is equivalent to $\dfrac{4x-3}{x+1}$?

A) 1

B) $4-\dfrac{1}{x+1}$

C) $4-\dfrac{7}{x+1}$

D) $4-7(x+1)$

Solution:

$x+1 \overline{)\,4x-3}$ quotient 4, $-(4x+4)$, remainder -7

So $\dfrac{4x-3}{x+1} = 4-\dfrac{7}{x+1}$

CONTINUE

5

$$(-4x^2+7x-3)-3(-2x^2+3x-1)$$

If the expression above is rewritten in the form of polynomial ax^2+bx+c, where a, b, and c are constant, what is the value of a?

A) -10
B) -2
C) 2
D) 3

Solution:

$-4x^2+7x-3+6x^2-9x+3$

$2x^2-2x = ax^2+bx+c$

$a=2$

$b=-2$

$c=0$

6

If $x^2+y^2=m$, and $xy=n$, which of the following is equivalent to $4m-8n$?

A) $(4x+4y)^2$
B) $(4x-4y)^2$
C) $(2x+2y)^2$
D) $(2x-2y)^2$

Solution:

$x^2+y^2=m \Rightarrow 4x^2+4y^2=4m$

$xy=n \Rightarrow -(8xy=8n)$

$4m-8n = 4x^2-8xy+4y^2$

$= (2x-2y)^2$

7

$$\frac{4x+5}{(x-2)^2}-\frac{4}{x-2}$$

If the expression above is rewritten in the form of polynomial $\frac{t}{(x-2)^2}$, where t *is positive* constant and $x\neq 2$. What is the value of t?

A) -13
B) -3
C) 3
D) 13

Solution:

$\frac{4x+5}{(x-2)^2}-\frac{4}{(x-2)} = \frac{4x+5-4(x-2)}{(x-2)^2}$

$= \frac{4x+5-4x+8}{(x-2)^2} = \frac{13}{(x-2)^2} = \frac{t}{(x-2)^2}$

$t=13$

8

Which of the following is equivalent to $(1.2x-1.5)^2-(4.44x^2+1.25)$?

A) $-3x^2-3.6x+1$
B) $-3x^2+3.6x$
C) $3x^2-3.6x+1$
D) $-3x^2+3.6x+1$

Solution:

$1.44x^2-3.6x+2.25-4.44x^2-1.25$

$-3x^2-3.6x+1$

CONTINUE

9

Which of the following is equivalent to $\frac{3x^2+4x}{x-2}$?

A) $3x-\frac{10x}{x-2}$

B) $3x+10+\frac{20}{x-2}$

C) $3x$

D) $x-2$

Solution:

$$x-2 \;\overline{)\; 3x^2+4x}$$

$3x+10$

$-(3x^2-6x)$

$0+10x$

$-(10x-20)$

$0+20$

So, $\frac{3x^2+4x}{x-2} = 3x+10+\frac{20}{x-2}$

10

Which of the following is equivalent to $\left(\frac{x}{2}-y\right)^2$?

A) $\frac{x^2}{4}+y^2$

B) $\frac{x^2}{2}+y^2$

C) $\frac{x^2}{4}-xy+y^2$

D) $\frac{x^2}{4}+xy+y^2$

Solution:

$$\left(\frac{x}{2}-y\right)^2 = \frac{x^2}{2^2} - 2\cdot\frac{x}{2}\cdot y + y^2$$

$$= \frac{x^2}{4} - xy + y^2$$

11

Which of the following is equivalent to $4(x-3)+11$?

A) $x-1$

B) $12x+11$

C) $-8x+11$

D) $4x-1$

Solution:

$4(x-3)+11$

$4x-12+11$

$4x-1$

12

Which of the following is equivalent to $x^2+10x+17$?

A) $(x+5)^2+17$

B) $(x+5)^2-17$

C) $(x+5)^2-8$

D) $(x+5)^2+8$

Solution:

$x^2+10x+17$

$\downarrow$

$x^2+2\cdot5\cdot x+5^2-5^2+17$

$(x+5)^2-25+17$

$(x+5)^2-8$

CONTINUE

13

Which of the following is equivalent to $\frac{x^2+4x+3}{x^2-x-2}$?

A) $\frac{x+3}{x+2}$

B) $\frac{x+3}{x-2}$

C) $\frac{x+1}{x-2}$

D) $\frac{x-1}{x+2}$

Solution:

$= \frac{(x+1)(x+3)}{(x-2)(x+1)} = \frac{x+3}{x-2}$

14

The expression $\frac{1}{5}x^2-3$ can be rewritten as $\frac{1}{5}(x-m)(x+m)$, where m *is positive* constant. What is the value of m?

A) -3

B) 10

C) 15

D) $\sqrt{15}$

Solution:

$\frac{1}{5}x^2-3=\frac{1}{5}(x+m)(x-m)$

$\frac{1}{5}(x^2-15)=\frac{1}{5}(x^2-m^2)$

$-15=-m^2$

$m=\sqrt{15}$

15

$(5019-163x^2)+23(7x^2-217)$

The expression can be rewritten as mx^2+n, where m and n are positive constant. What is the value of $m+n$?

A) -30

B) -28

C) 26

D) 30

Solution:

$5019-163x^2+161x^2-4991=mx^2+nx$

$-2x^2+28=mx^2+n$

$m=-2 \quad ; \quad n=28$

$m+n=-2+28$

$m+n=26$

16

$(5-x^2)-2(7-x^2+3x)+6x$

Which of the following is equivalent to expression above?

A) x^2-9

B) $-x^2-9$

C) $-x^2+12x-9$

D) $-x^2-12x-9$

Solution:

$5-x^2-14+2x^2-\cancel{6x}+\cancel{6x}$

x^2-9

CONTINUE

1

Which of the following is equivalent to $\frac{5}{3x-1}+2$?

A) $\frac{6x-2}{3x-1}$

B) $6x+1$

C) $\frac{6x+3}{3x-1}$

D) $\frac{6x+7}{3x-1}$

Solution:

$\frac{5}{3x-1}+2 \Rightarrow \frac{5+6x-2}{3x-1}$

$= \frac{3+6x}{3x-1}$

2

$(3x-2)(ax+5)-6x^2+7=bx-3$

In the expression above, a and b are constant. What is value of a?

A) 2

B) 3

C) 9

D) 11

Solution:

$3ax^2+15x-2ax-10-6x^2+7=bx-3$

$x^2(3a-6)+x(15-2a)-3=bx-3$

$3a-6=0$ $\quad$ $15-2a=b$

$a=2$ $\quad$ $15-2(2)=b$

$b=11$

3

If $x+4$ is a factor of the expression $x^2+mx-12$, what is the value of m?

A) -3

B) 1

C) 3

D) 4

Solution:

$x+4$ is factor means

$(x+4)(x+a)=x^2+mx-12$

$4a=-12 \Rightarrow a=-3$

So, $(x+4)(x-3)=x^2+x-12$

$=x^2+mx-12$

$m=1$

4

Which of the following is equivalent to $\frac{4x-3}{12}$?

A) $\frac{x-3}{4}$

B) $\frac{4x-1}{3}$

C) $\frac{x}{3}-\frac{1}{4}$

D) $\frac{x}{4}-\frac{1}{3}$

Solution:

$\frac{4x-3}{12}=\frac{4x}{12}-\frac{3}{12}$

$=\frac{x}{3}-\frac{1}{4}$

CONTINUE

5

If the polynomial $P(x)$, has factors of 6, $(x-4)$, and $(x+5)$, Which of the following must also be a factor of $P(x)$?

A) $6x^2-24$
B) $6x^2+30$
C) $x^2-8x+16$
D) $3x^2+3x-60$

Solution:

$P(x) = 6(x-4)(x+5)$

$= 6(x^2+x-20)$

$= \boxed{2(3x^2+3x-60)}$ or

$3(2x^2+2x-40)$

6

Which of the following is a factor of x^3-8?

A) x^2-2
B) x^2+2x+4
C) x^2-2x+4
D) $x+2$

Solution:

$x^3-8 = x^3-2^3$

$= (x-2)(x^2+2x+4)$

One of the factors is

$\boxed{x^2+2x+4}$

7

$$\frac{4x}{x-3} \div \frac{12}{3x-9}$$

Which of the following is equivalent to the expression above, given that $x \neq 3$?

A) x
B) $2x$
C) $x-3$
D) $\frac{x}{3}$

Solution:

$\frac{4x}{x-3} \cdot \frac{3x-9}{12} \Rightarrow \frac{4x}{x-3} \cdot \frac{3(x-3)}{12}$

$= \frac{12x}{12}$

$= \boxed{x}$

8

Which of the following is NOT equivalent to $8a^2$?

A) $4a^2+4a^2$
B) $(2a\sqrt{2})^2$
C) $8a(a)$
D) $(4a)\cdot(4a)$

A) $= 8a^2$

B) $= 4a^2 \cdot 2 = 8a^2$

C) $= 8a^2$

D) $= 16a^2$

CONTINUE

9

What is the coefficient of x^2 when $21x^2-\frac{1}{5}x+3$ is multiplied by the $10x-\frac{1}{7}$?

A) -5
B) -1
C) 1
D) 5

Solution:

$\left(21x^2-\frac{1}{5}x+3\right)\left(10x-\frac{1}{7}\right)$

$21x^2 \cdot -\frac{1}{7} = -3x^2$

$-\frac{1}{5}x \cdot 10x = -2x^2$

$-3x^2 - 2x^2 = -5x^2$

-5

10

Which of the following is equivalent to $\left(\frac{x}{2}-2y\right)^2$?

A) $\frac{x^2}{4}+y^2$
B) $\frac{x^2}{2}+y^2$
C) $\frac{x^2}{4}-xy+y^2$
D) $\frac{x^2}{4}+xy+y^2$

Solution:

$\left(\frac{x}{2}-2y\right)^2 = \frac{x^2}{4} - \frac{2x}{2}2y + 4y^2$

$= \frac{x^2}{4} - 2xy + 4y^2$

11

Which of the following is equivalent to $\frac{x^4+x^3}{x^3+x^2}$?

A) $\frac{x^7}{x^5}$
B) $2x$
C) x
D) 1

Solution:

$\frac{x^4+x^3}{x^3+x^2} = \frac{x^3(x+1)}{x^2(x+1)}$

$= x$

12

Which of the following is factor of polynomial of $a^2-12a+9$?

A) $(a-6)^2-9$
B) $(a-6)^2-27$
C) $(a+6)^2-9$
D) $(a+6)^2+27$

Solution:

$a^2-12a+9$

$a^2-2\cdot 6\cdot a+6^2-6^2+9$

$(a-6)^2-36+9$

$(a-6)^2-27$

CONTINUE

13

Which of the following is equivalent to $16a^4 + 8a^2b^2 + b^4$?

A) $(2a-b)^4$

B) $(2a-b)^2(2a+b)^2$

C) $(4a+b)^2(a-b)^2$

D) $(4a^2+b^2)^2$

Solution:

$16a^4 + 8a^2b^2 + b^4$

$\downarrow$

$(4a^2)^2 + 2\cdot 4a^2b^2 + (b^2)^2$

$\boxed{(4a^2+b^2)^2}$

14

Which of the following is equivalent to $\dfrac{2-\frac{1}{x}}{2+\frac{1}{x}}$?

A) $\dfrac{2x-1}{2x+1}$

B) $\dfrac{2x+1}{2x-1}$

C) $\dfrac{4x^2-1}{x^2}$

D) 1

Solution:

$$\frac{2-\frac{1}{x}}{2+\frac{1}{x}} = \frac{\frac{2x-1}{x}}{\frac{2x+1}{x}}$$

$$= \frac{2x-1}{x}\cdot\frac{x}{2x+1}$$

$$= \boxed{\frac{2x-1}{2x+1}}$$

15

Which of the following is equivalent to $\dfrac{ab-a^2}{ab+a^2}$?

A) $-\dfrac{a}{b}$

B) $-\dfrac{b}{a}$

C) $\dfrac{b-a}{a+b}$

D) $\dfrac{b+a}{a-b}$

Solution:

$$\frac{ab-a^2}{ab+a^2}$$

$$= \frac{a(b-a)}{a(b+a)}$$

$$= \boxed{\frac{b-a}{b+a}}$$

16

Which of the following is equivalent to $4x^4 - 4$?

A) $4(x^2-1)^2$

B) $4(x^2+1)^2$

C) $4(x^3-1)(x+1)$

D) $4(x^2+1)(x-1)(x+1)$

Solution:

$$4x^4 - 4 = 4(x^4-1)$$

$$= 4(x^2-1)(x^2+1)$$

$$= \boxed{4(x-1)(x+1)(x^2+1)}$$

CONTINUE

1

Which of the following is equivalent to $\frac{2}{x}+\frac{3}{4}$?

A) $\frac{5}{4x}$

B) $\frac{5}{4+x}$

C) $\frac{8}{3x}$

D) $\frac{8+3x}{4x}$

Solution:

$\frac{2}{x}+\frac{3}{4} \Rightarrow \frac{2(4)+3x}{4x}$

$(4)\quad (x)$

$= \boxed{\frac{8+3x}{4x}}$

2

$$\frac{3x^2+4}{x-1}=m+\frac{7}{x-1}$$

In the expression above, m is a constant. What is the value of m?

A) $3x-5$

B) $3x-4$

C) $3x+3$

D) $3x+4$

Solution:

$$x-1 \;\overline{)\; 3x^2+4}$$

$3x+3$

$-(3x^2-3x)$

$3x+4$

$-3x-3$

$0+7$

$\frac{3x^2+4}{x-1} = 3x+3+\frac{7}{x-1}$

$m = 3x+3$

3

If $x \neq 0$, what is the value of $\frac{2(5x)^2-5(2x)^2}{(2x)\cdot(3x)}$

A) -1

B) 1

C) 5

D) $5x$

Solution:

$\frac{2(25x^2)-5(4x^2)}{6x^2} = \frac{50x^2-20x^2}{6x^2}$

$= \frac{30x^2}{6x^2}$

$= \boxed{5}$

4

Which of the following is equivalent to $\frac{6x-5}{x+2}$?

A) $\frac{6-5}{1+2}$

B) $6-\frac{17}{x+2}$

C) $6-\frac{5}{x+2}$

D) $\frac{6}{x+2}-\frac{5}{x+2}$

Solution:

$$x+2 \;\overline{)\; 6x-5}$$

6

$-(6x+12)$

-17

$\frac{6x-5}{x+2} = \boxed{6-\frac{17}{x+2}}$

CONTINUE

5

$$\frac{5a^2-4a+1}{a-2}=5a+6+\frac{n}{a-2}$$

In the expression above, n is a constant. What is the value of n?

A) $2a-1$

B) 11

C) 13

D) $11x+13$

Solution:

$$\begin{array}{r} 5a+6 \\ a-2\ \overline{)\ 5a^2-4a+1} \\ -(5a^2-10a) \\ \hline 6a+1 \\ -(6a-12) \\ \hline 0+13 \end{array}$$

$5a+6+\frac{13}{a-12}$ → $n=13$

6

$$P(x)=2x^3-kx^2+4x-5$$

In the expression above, k is a constant. If $P(x)$ is divisible by $x+1$, what is the value of k?

A) -13

B) -11

C) 11

D) 13

Solution:

divisible by $x+1$ means $P(-1)=0$

$$2(-1)^3-k(-1)^2+4(-1)-5=0$$

$$-2-k-4-5=0$$

$$k=-11$$

7

$$\frac{6x^2+5x+2}{2x+1}=\frac{1}{2x+1}+m$$

In the expression above, m is a constant. What is the value of m?

A) $3x+1$

B) $3x-1$

C) $3x^2+x$

D) $2x^2+x+2$

Solution:

$$\begin{array}{r} 3x+1 \\ 2x+1\ \overline{)\ 6x^2+5x+2} \\ -(6x^2+3x) \\ \hline 0+2x+2 \\ 2x+1 \\ \hline 0+1 \end{array}$$

$3x+1+\frac{1}{2x+1}$

$m=3x+1$

8

Which of the following is equivalent to $\frac{4t}{t-2}$?

A) $4-2t$

B) 2

C) $4-\frac{8}{t+2}$

D) $4+\frac{8}{t-2}$

Solution:

$$\frac{4t}{t-2}=4+\frac{8}{t-2}$$

$$\begin{array}{r} 4 \\ t-2\ \overline{)\ 4t} \\ -(4t-8) \\ \hline +8 \end{array}$$

CONTINUE

9

$$P(x)=2x^3-kyx^2+5xy+2y-2$$

In the expression above, k is a constant. If $P(x)$ is divisible by $x-1$, what is the value of k?

A) -7
B) $-7y$
C) 7
D) $7y$

Solution:

divisible by $x-1 \rightarrow P(1)=0$

$2(1)^3-k\cdot y(1)^2+5\cdot 1\cdot y+2y-2=0$

$2-ky+5y+2y-2=0$

$7y=ky$

$\boxed{k=7}$

10

$$2x^2-4x-3=A(x-1)+B$$

In the expression above, A *and* B are constant, what is the value of A in terms of x?

A) $2x-2$
B) $2x+2$
C) $-2x+2$
D) -5

Solution:

$$x-1 \overline{)\,2x^2-4x-3}\quad 2x-2$$
$$-(2x^2-2x)$$
$$0-2x-3$$
$$-(2x+2)$$
$$0-5$$

$2x^2-4x-3=(x-1)(2x-2)-5$

A, B

$\boxed{A=2x-2}$

11

$$3x^2+5x-6=(ax+b)(x+2)+c$$

In the expression above, where *a, b and c* are constant, what is value the of $a+b+c$?

A) -5
B) -2
C) 0
D) 8

Solution:

$$x+2 \overline{)\,3x^2+5x-6}\quad 3x-1$$
$$-(3x^2+6x)$$
$$0-x-6$$
$$-(x-2)$$
$$0-4$$

$3x^2+5x-6=(3x-1)(x-2)-4$

$ax+b$ $+c$

$c=-4$; $a=3$; $b=-1$

$a+b+c=3-1-4$

$=\boxed{-2}$

12

$$P(x)=mx^4+nx^3-3x^2+5x$$

In the expression above, *m and n* are constant. If $P(x)$ is divisible by $x-1$, and $x+1$, what is the value of m?

A) -2
B) 1
C) 3
D) 5

Solution:

divisible by $\begin{cases} x-1 \rightarrow P(1)=0 \\ x+1 \rightarrow P(-1)=0 \end{cases}$

$\left.\begin{array}{l} m+n-3+5=0 \\ m-n-3-5=0 \end{array}\right\}$ $\begin{array}{l} m+n=-2 \\ m-n=8 \end{array}$

$2m=6$

$\boxed{m=3}$

CONTINUE

13

For a polynomial $P(x)$, $P(-2)=0$. Which of the following must be true about $P(x)$?

A) $-2x$ is a factor of $P(x)$

B) $-2x+2$ is a factor of $P(x)$

C) $x-2$ is a factor of $P(x)$

D) $x+2$ is a factor of $P(x)$

Solution:

$P(-2)=0$

$(x+2)$ is factor of $P(x)$

14

If the polynomial $P(x)$ is divisible by $x-5$, which of the following could be $P(x)$?

A) $2x^2-7x-15$ $P(5)=0$

B) $2x^2+7x-15$ $P(15)=70$

C) $2x^2-7x+15$ $P(5)=30$

D) $2x^2+7x+15$ $P(5)=100$

Solution:

divisible by $x-5$ means

$P(5)=0$ or $x-5$ is a factor

15

Which of the following is equivalent to $\frac{x^3y-xy^3}{x^2y-xy^2}$?

A) $x+y$

B) $x-y$

C) xy

D) $\frac{x+y}{x-y}$

Solution:

$$\frac{x^3y-xy^3}{x^2y-xy^2}=\frac{xy(x^2-y^2)}{xy(x-y)}$$

$$=\frac{(x-y)(x+y)}{(x-y)}$$

$$=x+y$$

16

For a polynomial $P(x)$, $P\left(\frac{3}{4}\right)=0$. Which of the following must be a factor of $P(x)$?

A) $3x+4$

B) $3x-4$

C) $4x+3$

D) $4x-3$

Solution:

$P\left(\frac{3}{4}\right)=0 \Rightarrow x-\frac{3}{4}$ is a factor

$\frac{4x-3}{4}$ can be a factor

$4x-3$ is also a factor of $P(x)$

CONTINUE

1

Which of the following is equivalent to $\frac{6xy(4x-5)-3x(8y-7xy)}{3xy}$?

A) -18
B) $15x-18$
C) 18
D) $15x+18$

Solution:

$$= \frac{24x^2y - 30xy - 24xy + 21x^2y}{3xy}$$

$$= \frac{45x^2y - 54xy}{3xy}$$

$$= \frac{3xy(15x-18)}{3xy} = 15x-18$$

2

$$2x^2+3x+ax+b=(c-2)x^3+dx^2+c$$

In the expression above, a, b, c, and d are constant. What is the value of $a+b+c+d$?

A) 3
B) 4
C) 6
D) 8

Solution:

$2x^2+3x+ax+b = (c-2)x^3+dx^2+c$

$(a+3)x$ → $a=-3$

0: $c-2=0$ → $c=2$

$d=2$

$b=c=2$

$a+b+c+d = -3+2+2+2$

$= 3$

3

$$\frac{1}{x^2+3x+2}=\frac{A}{x+2}+\frac{B}{x+1}$$

In the expression above, A, and B are constant. What is the value of $A\cdot B$?

A) -2
B) -1
C) 1
D) 2

Solution:

$$\frac{1}{x^2+3x+2} = \frac{Ax+A+Bx+2B}{x^2+3x+2} = \frac{(A+B)x+A+2B}{x^2+3x+2}$$

$A+B=0$, $A+2B=1$ $\Rightarrow$ $A=-B$, $B=1$, $A=-1$

$AB = (-1)(1) = -1$

4

$$\frac{3x-2}{(x-3)(x+1)}=\frac{A}{x-3}+\frac{B}{x+1}$$

(A over $(x-3)$, B over $(x+1)$)

In the expression above, A, and B are constant.

What is the value of $\frac{A}{B}$?

A) $\frac{5}{4}$
B) $\frac{7}{5}$
C) $\frac{7}{4}$
D) $\frac{1}{4}$

Solution:

$3x-2 = x(A+B)+A-3B$

$3/A+B=3$

$A-3B=-2$

$\Rightarrow 3A+3B=9$, $A-3B=-2$

$4A=7$

$A=\frac{7}{4}$; $B=\frac{5}{4}$

$\frac{A}{B} = \frac{\frac{7}{4}}{\frac{5}{4}} = \frac{7}{5}$

CONTINUE

5

If $a-b=4$, and $a\cdot b=3$, where a and b are real numbers. What is the value of a^2+b^2?

A) 10
B) 16
C) 22
D) 28

Solution:

$a-b=4$, $ab=3$ $\}$ $a^2+b^2=?$

$(a-b)^2=4^2$
$a^2-2ab+b^2=16$
$a^2-2\cdot 3+b^2=16$
$a^2+b^2=16+6$
$a^2+b^2=22$

6

If $a+b=4$, and $a\cdot b=3$, where a and b are real numbers. What is the value of a^3+b^3?

A) 28
B) 48
C) 52
D) 56

Solution:

$a+b=4$, $ab=3$ $\}$ $a=3$, $b=1$

a^3+b^3
3^3+1^3
$=28$

7

If $b-a=8$, and $a-c=10$, where a, b and c are real numbers. What is the value of $ab+bc-ac-b^2$?

A) 144
B) 108
C) 88
D) -144

Solution:

$ab+bc-ac-b^2$
$c(b-a)+b(a-b)$
$c(b-a)-b(b-a)=(c-b)(b-a)$
$-18 \quad 8$
$=-144$

$b-a=8$
$+\ a-c=10$
$b-c=18$
$c-b=-18$

8

Which of the following is equivalent to $\dfrac{\frac{t-1}{1}}{\frac{1}{t}-1}\div t-1$?

A) -2
B) 0
C) $\dfrac{t}{1-t}$
D) t

Solution:

$\dfrac{\frac{t-1}{1-t}}{\frac{1}{t}}\cdot\dfrac{1}{t-1}\Rightarrow\dfrac{(t-1)t}{1-t}\cdot\dfrac{1}{t-1}$

$=\dfrac{t}{1-t}$

CONTINUE

9

$$P(x)=x^3+4x^2+2mx-5$$

In the expression above, m is a constant. If $P(x)$ is divisible by $x-1$, what is the value of m?

A) -2
B) -1
C) 0
D) 1

Solution:

divisible by $x-1 \rightarrow P(1)=0$

$1^3+4(1)^2+2m(1)-5=0$

$1+4+2m-5=0$

$2m=0$

$m=0$

10

$$7x^2+x+5=A(x+2)+B$$

In the expression above, A *and* B are constant, what is the value of B?

A) $7x-13$
B) $7x+13$
C) 13
D) 31

Solution:

$$\begin{array}{r} 7x-13 \\ x+2 \overline{)\,7x^2+x+5} \\ -(7x^2+14x) \\ \hline 0-13x+5 \\ -(13x-26) \\ \hline 0+31 \end{array}$$

$7x^2+x+5=(7x-13)(x+2)+31$ (31 → B)

11

$$4x^2+10x+2=(ax-b)(cx+3)+8$$

In the expression above, where a, b *and* c are constant, what is value the of $a+b+c$?

A) 3
B) 5
C) 6
D) 9

Solution:

$4x^2+10x+2=(ax-b)(cx+3)+8$

acx^2 $-bcx$ $3ax$ $-3b$

$ac=4$
$3a-bc=10$
$-3b+8=2$

$a=4$
$c=1$
$b=2$

$a+b+c=7$

12

$$P(x)=2x^3+ax^2+5x+2$$

In the expression above, a is a constant. If $P(x)$ is divisible by $x+2$, what is the value of a?

A) -6
B) -4
C) 4
D) 6

Solution:

divisible by $x+2 \rightarrow P(-2)=0$

$2(-2)^3+a(-2)^2+5(-2)+2=0$

$-16+4a-10+2=0$

$4a=24$

$a=6$

CONTINUE

13

Which of the following is equivalent to $\frac{a^2-b^2}{a-b}+\frac{a^2-b^2}{a+b}=?$

A) a

B) $2a$

C) b

D) 2

Solution:

$$\frac{(a-b)(a+b)}{(a-b)}+\frac{(a-b)(a+b)}{(a+b)}$$

$$a+b+a-b$$

$$=\boxed{2a}$$

14

Which of the following is equivalent to $\frac{x^2-x}{x^2-x+1}\div\frac{1-x^2}{x^3+1}$?

A) $1-x$

B) $x+1$

C) $-x$

D) x

Solution:

$$\frac{x(x-1)}{x^2-x+1}\cdot\frac{(x+1)(x^2-x+1)}{(1-x)(1+x)}$$

$$=\boxed{-x}$$

15

Which of the following is equivalent to $\frac{x-1}{x+2}\cdot\frac{x^2+3x+2}{x^2-1}$?

A) 1

B) $\frac{1}{x-1}$

C) $\frac{1}{x+2}$

D) $x+2$

Solution:

$$\frac{(x-1)}{(x+2)}\cdot\frac{(x+1)(x+2)}{(x-1)(x+1)}=\boxed{1}$$

16

Which of the following is equivalent to $\frac{x^2-1}{x-1}-\frac{x^2+1}{x+1}$?

A) $\frac{2x-1}{x+1}$

B) $\frac{2x}{x+1}$

C) $\frac{2x+1}{x+1}$

D) x

Solution:

$$\frac{(x-1)(x+1)}{x-1}-\frac{x^2+1}{x+1}\Rightarrow x+1-\frac{x^2+1}{x+1}$$

$$=\frac{x^2+2x+1-x^2-1}{x+1}=\boxed{\frac{2x}{x+1}}$$

CONTINUE

1

If $m > 0$ and $m^2 - 9 = 0$, what is the value of m?

A) -9
B) -3
C) 3
D) 9

Solution:

$m^2 - 9 = 0$

$m^2 = 9$

$m = \mp 3$

$m > 0$; $m = 3$

2

$$\sqrt[3]{2t^2 + 46} - x = 0$$

If $t > 0$ and $x = 4$, what is the value of t?

A) 1
B) 3
C) 6
D) 9

Solution:

$\left(\sqrt[3]{2t^2+46}\right)^3 = (x)^3$

$2t^2 + 46 = x^3 \Rightarrow x = 4$

$2t^2 + 46 = 4^3 = 64$

$2t^2 = 18$

$t^2 = 9$; $t = \mp 3$

$t > 0$; $t = 3$

3

What is the sum of all values of x that satisfy $12x^2 - 13x + 1 = 0$?

A) $\frac{12}{13}$
B) $\frac{13}{12}$
C) $\frac{1}{13}$
D) $\frac{1}{12}$

Solution:

$12x^2 - 13x + 1 = 0$

$a = 1$; $b = -13$; $c = 1$

$x_1 + x_2 = -\frac{b}{a} = -\frac{-13}{12}$

$= \frac{13}{12}$

4

What is the product of all values of x that satisfy $2x^2 - 15x - 8 = 0$?

A) $\frac{2}{15}$
B) $\frac{15}{2}$
C) $-\frac{1}{4}$
D) 8

Solution:

$2x^2 - 15x - 8 = 0$

$x \quad -8$

$2x \quad +1$

$-16x + x = -15x$

$(x-8)(2x+1) = 0$

$x = 8$; $x = -\frac{1}{2}$

CONTINUE

5

What are the solutions to $3x^2-6x+1=0$?

A) $1\pm\frac{\sqrt{6}}{3}$

B) $6\pm\frac{\sqrt{6}}{3}$

C) $-1\pm\frac{\sqrt{6}}{3}$

D) $-6\pm\frac{\sqrt{6}}{3}$

Solution:

$3x^2-6x+1=0$

$a=3;\ b=-6;\ c=1$

$\Delta=b^2-4ac=(-6)^2-4(1)(3)=24$

$x_{12}=\frac{6\mp\sqrt{24}}{2\cdot3}=\frac{6\mp\sqrt{24}}{6}$

$=\boxed{1\mp\frac{\sqrt{6}}{3}}$

6

$$x^3\left(x^2-10\right)=-9x$$

If $x>0$ what is the one possible solution to the equation above?

A) 2

B) 3

C) 6

D) 9

Solution:

$x^5-10x^3=-9x$

$x^5-10x^3+9x=0$

$x\left(x^4-10x^2+9\right)=0$

$\hookrightarrow x=0$

$x^4-10x^2+9=0 \Rightarrow (x^2-1)(x^2-9)=0$

$x^2=1$ and $x^2=9$

$x=\mp1$ and $x=\mp3$

$\{-3,-1,0,1,3\}$

7

$$2x^3+3x^2-7x-8=0$$

For what values of x, is the equation above true?

A) -2

B) -1

C) 1

D) 2

Solution:

product of roots is $-\frac{-8}{2}=4$

roots can be $-4,-2,-1,2,2,4$

Let's plug in $x=1$

$2(-1)^3+3(-1)^2-7(-1)-8=0$

$-2+3+7-8=0$

$0=0$

$\therefore\ x=-1$

8

What are the solutions of the quadratic equation $2x^2-10x-12=0$?

A) $x=-6$ and $x=-1$

B) $x=-6$ and $x=1$

C) $x=-1$ and $x=6$

D) $x=1$ and $x=6$

Solution:

$2x^2-10x-12=0$

$x^2-5x-6=0$

$(x-6)(x+1)=0$

$\boxed{x=6 \text{ or } x=-1}$

CONTINUE

9

$$y = 2x^2$$
$$2y + 4 = 2(x+3)$$

If (x,y) is a solution of the system of equations above and $x > 0$ what is the value of xy?

A) -2
B) -1
C) 1
D) 2

Solution:

$2(2x^2) + 4 = 2(x+3)$
$4x^2 + 4 = 2x + 6$
$4x^2 - 2x - 2 = 0$
$2x^2 - x - 1 = 0$

$x \cdot 2x$, $-1 \cdot 1$ $\Rightarrow (x-1)(2x+1) = 0$

$x = 1$; $x = -\frac{1}{2}$

$y = 2$; $y = \frac{1}{2}$

$x \cdot y = 1 \cdot 2 = 2$

$x \cdot y = -\frac{1}{2} \cdot \frac{1}{2} = -\frac{1}{4}$

10

$$2x^2 - 5x = m$$

In the equation above, m is a constant. If equation has no real solutions, which of the following could be the value m?

A) –4
B) –3
C) 3
D) 4

Solution:

$2x^2 - 5x - m = 0$

No real roots mean $\Delta < 0$

$\Delta = (-5)^2 - 4(2)(-m)$

$m < \frac{-25}{8}$

$m = -4$

11

What is the sum of solutions to $(x+5.2)(x-1.2) = 0$?

A) –6.4
B) –4
C) 4
D) 6.4

Solution:

$(x+5.2)(x-1.2) = 0$

$x_1 = -5.2$; $x_2 = 1.2$

$x_1 + x_2 = -5.2 + 1.2 = -4$

12

In the equation $(bx-3)^2 = 25$, b is a constant. If $x = 2$ is one solution to the equation, what is a possible value of b?

A) –4
B) –2
C) –1
D) 2

Solution:

plug in $x = 2$ in $(bx-3)^2 = 25$

$(2b-3)^2 = 25$

$2b - 3 = 5$ and $2b - 3 = -5$

$2b = 8$ $\quad$ $2b = -2$

$b = 4$ $\quad$ $b = -1$

CONTINUE

13

$$y = 3x^2 - x - 3$$
$$y = -2x + 7$$

If (x, y) is a solution of the system of equations above, what is the one possible value of y?

A) -2
B) -1
C) 1
D) 11

Solution:

$3x^2 - x - 3 = -2x + 7$

$3x^2 + x - 10 = 0$

$x \quad 2$
$3x \quad -5$

$(x+2)(3x-5) = 0$

$x = -2$; $x = \frac{5}{3}$

$y = -2(-2) + 7$

$y = 11$

$y = -2\left(\frac{5}{3}\right) + 7$

$y = 11/3$

14

$$\sqrt{3x+10} + 5 = x + 7$$

What is the solution set of equation above?

A) $\{-3, -2\}$
B) $\{-3, 2\}$
C) $\{-2, 3\}$
D) $\{2\}$

Solution:

$\sqrt{3x+10} = x + 2$

$3x + 10 = x^2 + 4x + 4$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = -3$; $x = 2$

check:

$\sqrt{3(-3) + 10} = -3 + 2$

$1 = -1$

False

check:

$\sqrt{3(2) + 10} = 2 + 2$

$4 = 4$

True

15

$$y = x^2 - x + 3$$
$$y - 4x + 7 = 0$$

How many solution are there to the system of equations above?

A) There are no solutions.
B) There is exactly one solution.
C) There are exactly two solutions.
D) There are exactly four solution.

Solution:

$x^2 - x + 3 = 4x - 7$

$x^2 - 5x + 12 = 0$

$\Delta = (-5)^2 - 4 \cdot 1 \cdot 12$

$\Delta = 25 - 48 = -23 < 0$

There are no solution

16

$$ax^3 + bx^2 + cx + d = 0$$

In the equation above, a, b, c, and d are constant. If the equation has roots, -2, 3, and 7, which of the following is a factor of $ax^3 + bx^2 + cx + d = 0$?

A) $x - 7$
B) $x - 2$
C) $x + 3$
D) $x + 7$

Solution:

Roots are -2, 3 and 7

so $(x+2)(x-3)(x-7)$

$= ax^3 + bx^2 + cx + d$

CONTINUE

1

$$m^2 - m - 20 = 0$$

If m is a solution of the equation above and $m < 0$, what is the value of m?

A) -5
B) -4
C) -3
D) -1

Solution:

$m^2 - m - 20 = 0$

$(m-5)(m+4) = 0$

$m = 5$, $m = -4$ } $m < 0$

$m = -4$

2

$$\frac{9}{x-2} = x - 2$$

In the equation above, which of the following is a possible value of $x - 2$?

A) -9
B) -1
C) 3
D) 9

Solution:

$9 = (x-2)(x-2)$

$(x-2)^2 = 9$

$x - 2 = \mp 3$

3

$$\frac{x}{x-2} = \frac{3x}{3}$$

Which of the following are a possible value of x?

A) 0 and 2
B) 0 and 3
C) 0 and 5
D) 2 and 5

Solution:

$3x = 3x(x-2)$

$3x = 3x^2 - 6x$

$3x^2 - 9x = 0$

$3x(x-3) = 0$

$x = 0$; $x = 3$

4

$$\sqrt{x+6} = -x$$

What is the solution set of equation above?

A) $\{-2\}$
B) $\{3\}$
C) $\{-2, 3\}$
D) There are no solutions.

Solution:

$(\sqrt{x+6})^2 = (-x)^2$

$x + 6 = x^2$

$x^2 - x - 6 = 0$

$(x-3)(x+2) = 0$

$x = 3$ $x = -2$

$\sqrt{3+6} = -3$ $\sqrt{-2+6} = -(-2)$

$3 = 3$ $2 = 2$

False True

CONTINUE

5

$$\sqrt{x^2} = x$$

Which of the following is the solution of the equation above?

A) -4
B) -2
C) 2
D) There are no solutions.

Solution:

$\sqrt{x^2} = x$

$\downarrow$

$x = x \Rightarrow x \geq 0$

$x = 2 \geq 0$

6

$$\frac{x^2-4}{x+2} = -2$$

What are the solutions to the equation above?

A) $x = -2$ and $x = 0$
B) $x = -2$ and $x = 2$
C) $x = 0$ and $x = 2$
D) $x = 0$

Solution:

$\frac{x^2-4}{x+2} + 2 = 0 \Rightarrow \frac{x^2-4+2x+4}{x+2} = 0$

$\frac{x^2+2x}{x+2} = 0$

$x^2+2x = 0$

$x(x+2) = 0$

$x = 0$ and $x = -2$ and $x+2 \neq 0$, $x \neq -2$

conflict

7

$$\frac{x^2-4}{x-2} = 4$$

What are the solutions to the equation above?

A) There are no solutions.
B) $x = 2$
C) $x = 2$ and $x = 4$
D) $x = -2$ and $x = 4$

Solution:

$\frac{x^2-4}{x-2} - 4 = 0 \Rightarrow \frac{x^2-4-4x+8}{x-2} = 0$

$\frac{x^2-4x+4}{x-2} = 0$

x^2-4x+4

$(x-2)^2 = 0$ and $x-2 \neq 0$

$x = 2$ $\quad x \neq 2$

There is a conflict. so, no solution.

8

$$\sqrt{2x} = x-4$$

What are the solutions to the equation above?

A) $\{-8,-2\}$
B) $\{8\}$
C) $\{2,8\}$
D) There are no solutions.

Solution:

$(\sqrt{2x})^2 = (x-4)^2$

$2x = x^2-8x+16$

$x^2-10x+16 = 0$

$(x-2)(x-8) = 0$

$x = 2$ and $x = 8$

check:

$\sqrt{2 \cdot 2} = 2-4$

$2 = -2$

false

check

$\sqrt{2 \cdot 8} = 8-4$

$4 = 4$

True

CONTINUE

9

$$2x^2 = 5x + c$$

In the equation above, c is a constant. If $x = 2$ is a solution of this equation, what other value of x satisfies the equation?

A) $\frac{-1}{2}$

B) 0

C) $\frac{1}{2}$

D) $\frac{3}{4}$

Solution:

$x_1 = 2 \Rightarrow 2 \cdot 2^2 = 5 \cdot 2 + c \Rightarrow c = -2$

$2x^2 - 5x + 2 = 0$

$x_1 x_2 = \frac{c}{a} = \frac{2}{2} = 1$

$2 x_2 = 1$

$x_2 = \frac{1}{2}$

10

$$x + \frac{25}{x} = 10$$

In the equation above, if $x > 0$, what is the solution of the equation?

A) -5

B) 1

C) 2

D) 5

Solution:

$\frac{x^2 + 25}{x} = 10$

$\frac{x^2 - 10x + 25}{x} = 0$

$x^2 - 10x + 25 = 0$

$(x-5)^2 = 0$

$x = 5$ and $x \neq 0$

11

Which of the following are solutions to the quadratic equation $(x+2)^2 = \frac{4}{9}$?

A) $x = -\frac{8}{3}$ and $x = \frac{4}{3}$

B) $x = -\frac{8}{3}$ and $x = \frac{-4}{3}$

C) $x = -\frac{2}{3}$ and $x = \frac{2}{3}$

D) $x = -2$ and $x = 2$

Solution:

$x + 2 = \frac{2}{3}$ and $x + 2 = -\frac{2}{3}$

$x = \frac{-4}{3}$ and $\frac{-8}{3}$

12

In the equation $(ax+1)^2 = 9$, a is a constant. If $x = 2$ is one solution to the equation, what is a possible value of a?

A) -3

B) -2

C) -1

D) 2

Solution:

$x = 2 \Rightarrow (2a+1)^2 = 9$

$2a + 1 = 3$ and $2a + 1 = -3$

$2a = 2$ $\quad$ $2a = -4$

$a = 1$ $\quad$ $a = -2$

CONTINUE

13

$$\frac{x^2-x-6}{x+3}=\sqrt{3x+10}$$

In the equation above can be solved for two solutions, one of which is extraneous. What is the value of the extraneous solution?

A) -3
B) -2
C) 2
D) 3

Solution:

$$\frac{(x-3)(x+2)}{x+3}=\sqrt{3x+10}$$

$$x+3\neq 0$$

$$x\neq -3$$

extraneous root

14

If $6t^2-5t-6=0$, what is the possible value of t?

A) $-\frac{3}{2}$
B) $-\frac{2}{3}$
C) $\frac{2}{3}$
D) $\frac{3}{4}$

Solution:

$$6t^2-5t-6=0$$

$3t$ and 2, $2t$ and -3

$$(3t+2)(2t-3)=0$$

$$t=-\frac{2}{3} \text{ and } t=\frac{3}{2}$$

15

$$\frac{2}{3y}=\frac{y}{12}$$

What are the solutions to the equation above?

A) $\{-2,2\}$
B) $\{-4,4\}$
C) $\{2,8\}$
D) $\{-2\sqrt{2},2\sqrt{2}\}$

Solution:

$$\frac{2}{3y}=\frac{y}{12}$$

$$3y^2=24$$

$$y^2=8$$

$$y=\mp 2\sqrt{2}$$

16

The equation $x^2-4x=-1$ has two solutions for x. What is the larger value of x?

A) $2-\sqrt{3}$
B) $\sqrt{3}$
C) $2+\sqrt{3}$
D) 5

Solution:

$$x^2-4x=-1$$

$$x^2-4x+1=0$$

$$\Delta=(-4)^2-4(1)(1)=16-4=12$$

$$x_{1,2}=\frac{4\mp\sqrt{12}}{2}=\frac{4\mp 2\sqrt{3}}{2}$$

$$x_{12}=2\mp\sqrt{3}$$

The larger root is $2+\sqrt{3}$

CONTINUE

1

$3x^2-4x-2=0$

Which of the following is solution to the quadratic equation shown above?

A) $\frac{4\pm\sqrt{10}}{6}$

B) $\frac{2\pm\sqrt{10}}{6}$

C) $\frac{2\pm\sqrt{10}}{4}$

D) $\frac{2\pm\sqrt{10}}{3}$

Solution:

$3x^2-4x-2=0$

$\Delta=(-4)^2-4(3)(-2)=16+24=40$

$x_{1,2}=\frac{4\mp\sqrt{40}}{2\cdot 3}=\frac{4\mp 2\sqrt{10}}{6}$

$x_{12}=\frac{2\mp\sqrt{10}}{3}$

2

$2x^2=7x-m$

If one of the solutions of the equation above $x=-\frac{3}{2}$, which of the following is the other possible value of x?

A) -15

B) -5

C) 2

D) 5

Solution:

$2x^2-7x+m=0$; $x_1=-\frac{3}{2}$

$x_1+x_2=-\frac{-7}{2}=\frac{7}{2}$

$-\frac{3}{2}+x_2=\frac{7}{2}$

$x_2=5$

3

If $3x^2=63-12x$ and $x<0$, what is the value of x^2?

A) 64

B) 49

C) 36

D) 9

Solution:

$3x^2+12x-63=0$; $x<0$

$x^2+4x-21=0$

$(x+7)(x-3)=0$

$x=-7$ and ~~$x=3$~~

$x<0$

$x^2=(-7)^2=49$

4

If $x^2=2x+15$ and $x>0$, what is the value of x^3?

A) -125

B) -27

C) 27

D) 125

Solution:

$x^2-2x-15=0$

$(x-5)(x+3)=0$

$x=5$ ~~$x=-3$~~

$x>0$

$x^3=5^3\Rightarrow 125$

CONTINUE

5

Which of the following equation has NO real solutions?

A) $x^2-5x-2=0$ $\Delta>0$

B) $x^2-3x-3=0$ $\Delta>0$

C) $x^2-6x+11=0$ $\Delta<0$

D) $x^2-2x-15=0$ $\Delta>0$

Solution:

No real solution $\Rightarrow$ $\Delta<0$

$x^2-5x-2=0$;

$\Delta=(-5)^2-4\cdot1\cdot(-2)=33$

$x^2-3x-2=0$;

$\Delta=(-3)^2-4\cdot1\cdot(-2)=17$

$x^2-6x+1=0$;

$\Delta=(-6)^2-4\cdot1(11)=-8$

$x^2-2x-15=0$;

$\Delta=(-2)^2-4\cdot1(-15)=64$

6

$$2x^2+8x+4=0$$

What are the solutions to the equation above?

A) $-2\pm\sqrt{2}$

B) $-4\pm4\sqrt{2}$

C) $4\pm4\sqrt{2}$

D) $2\pm\sqrt{2}$

Solution:

$x^2+4x+2=0$

$\Delta=4^2-4\cdot2\cdot1=8$

$x_{1,2}=\frac{-4\pm\sqrt{8}}{2}=\frac{-4\pm2\sqrt{2}}{2}$

7

$$3x^2=10x-8$$

If m and n are the two solutions to the equation above and $m>n$, what is the value of n^2?

A) 9

B) $\frac{4}{9}$

C) $\frac{16}{9}$

D) 4

Solution:

$3x^2-10x+8=0$

$3x$ -4

x -2

$x=\frac{4}{3}$; $x=2$

$m>n \Rightarrow m=2$, $n=\frac{4}{3}$

$n^2=\frac{16}{9}$

8

What is the sum of the solutions of the equation $(2x-3)^2=4x-3$?

A) -4

B) -3

C) 3

D) 4

Solution:

$4x^2-12x+9=4x-3$

$4x^2-16x+12=0$

$x^2-4x+3=0$

$(x-3)(x-1)=0$

$x=3$; $x=1$

$x_1+x_2=4$

CONTINUE

9

$$x^2+2x-7=0$$

What are the solutions to the equation above?

A) $-1\pm2\sqrt{2}$

B) $1\pm2\sqrt{2}$

C) -1 ± 4

D) 1 ± 4

Solution:

$x^2+2x-7=0$

$\Delta = 2^2-4\cdot1(-7)=32$

$x_{1,2}=\dfrac{-2\mp\sqrt{32}}{(2)(1)}$

$=\dfrac{-2\mp4\sqrt{2}}{2}$

$=\boxed{-1\mp2\sqrt{2}}$

10

$$x^4-81=0$$

In the equation above, if $x<0$, what is the solution of the equation?

A) -9

B) -6

C) -3

D) -2

Solution:

$x^4=81$

$x=\mp3$

$x<0$; $\boxed{x=-3}$

11

Which of the following are solutions to the quadratic equation $\dfrac{x^2-3x+2}{x^2+5x-6}=0$?

A) $\{1,2\}$

B) $\{2\}$

C) $\{-6,1\}$

D) $\{-1\}$

Solution:

$\dfrac{(x-2)(x-1)}{(x+6)(x-1)}=0$

$(x-2)(x-1)=0$ and $(x+6)(x-1)\neq0$

$x=2$; $x=1$ $\quad$ $x\neq-6$; $x\neq1$

conflict

$\boxed{x=2}$

12

Which of the following are solutions to the quadratic equation $x^3+10x^2+24x=0$?

A) $\{0\}$

B) $\{-6,-4,0\}$

C) $\{-6,-4\}$

D) $\{-2,2\}$

Solution:

$x(x^2+10x+24)=0$

$x(x+4)(x+6)=0$

$\boxed{x=0\ ;\ x=-4\ ;\ x=-6}$

CONTINUE

13

Which of the following are solutions to the quadratic equation $6x^2+5x=4-7x-3x^2$?

A) $-\frac{2\mp 2\sqrt{2}}{3}$

B) $\frac{12\mp 2\sqrt{2}}{18}$

C) $\frac{2\mp 12\sqrt{2}}{3}$

D) There is no solution.

Solution:

$6x^2+5x = 4-7x-3x^2$

$9x^2+12x-4=0$

$\Delta = 12^2-4(9)(-4) = 288$

$x_{12} = \frac{-12\mp 12\sqrt{2}}{2\cdot 9} = \frac{-12\mp 12\sqrt{2}}{18}$

$= \boxed{\frac{-2\mp 2\sqrt{2}}{3}}$

14

If the equation of $mx^2+(2m+1)x+m-1=0$, has double root, what is the possible value of m?

A) 8

B) 4

C) $\frac{1}{8}$

D) $-\frac{1}{8}$

Solution:

$\Delta = 0 \rightarrow$ double root

$\Delta = (2m+1)^2-4m(m-1) = 0$

$4m^2+4m+1-4m^2+4m=0$

$8m=-1$

$\boxed{m=\frac{-1}{8}}$

15

$$\left.\begin{aligned} x+y=5 \\ x\cdot y=6 \end{aligned}\right\}$$

What are the solutions to the system of equation above?

A) $\{(1,3)(2,1)\}$

B) $\{(2,3)(3,3)\}$

C) $\{(2,3)(3,2)\}$

D) $\{(3,2)\}$

Solution:

$x=5-y$

$xy=6$

$(5-y)(y)=6$

$5y-y^2=6$

$y^2-5y+6=0$

$(y-2)(y-3)=0$

$y=2 \rightarrow x=3$; $y=3 \rightarrow x=2$

$\{(3,2),(2,3)\}$

16

What is the product of the roots of the equation of $x^2+\sqrt{2}x-4=0$?

A) $\sqrt{2}$

B) $-\sqrt{-2}$

C) 4

D) -4

Solution:

$x^2+\sqrt{2}x-4=0$

$a=1$; $b=\sqrt{2}$; $c=-4$

$x_1x_2 = \frac{c}{a} = \frac{-4}{1} = \boxed{-4}$

CONTINUE

1

$$ax^2-2(a-1)x+a=0$$

If x_1 and x_2 are solution of the equation above and $x_1=x_2$, what is the value of a?

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) 0

D) 1

Solution:

$x_1 = x_2 \Rightarrow \Delta = 0$

$\Delta = (-2(a-1))^2 - 4a \cdot a$

$4a^2 - 8a + 4 - 4a^2 = 0$

$8a = 4$

$a = \frac{1}{2}$

2

$$2x^2+ax+2=0$$

In the equation above, one of the roots of equation is -2, which of the following is a possible value of a?

A) 1

B) 2

C) 3

D) 5

Solution:

$2x^2 + ax + 2 = 0$; $x_1 = -2$

$2(-2)^2 + a(-2) + 2 = 0$

$2a = 10$

$a = 5$

3

$$3x^2+2x-1=0$$

Which of the following is a possible value of x?

A) $-\frac{1}{3}$

B) -1

C) 1

D) $\frac{2}{3}$

Solution:

$3x^2 + 2x - 1 = 0$

$x \quad 1$

$3x \quad -1$

$(x+1)(3x-1) = 0$

$x = -1$ or $x = \frac{1}{3}$

4

$$2x^2+mx+m-2=0$$

If x_1 and x_2 are solution of the equation above and $x_1=x_2$, what is the value of m?

A) $\frac{1}{2}$

B) 2

C) $\frac{8}{3}$

D) 4

Solution:

$2x^2 + mx + m - 2 = 0$

$x_1 = x_2 \Rightarrow \Delta = 0$

$\Delta = m^2 - 4 \cdot 2(m-2) \Rightarrow m^2 - 8m + 16 = 0$

$(m-4)^2 = 0$

$m = 4$

CONTINUE

5

Which of the following is the sum of the roots of the equation of $(x-1)(x-4)=2-2x$?

A) 2
B) 3
C) 4
D) 5

Solution:

$x^2-5x+4=2-2x$

$x^2-3x+2=0$

$x_1+x_2=\frac{-b}{a}=-\frac{-3}{1}$

$=\boxed{3}$

6

$$x^2-13x-36=0$$

If x_1 and x_2 are solution of the equation above, what is the value of $\frac{x_1+x_2}{x_1\cdot x_2}$?

A) $-\frac{13}{12}$
B) $-\frac{1}{3}$
C) $-\frac{13}{36}$
D) 0

Solution:

$\frac{x_1+x_2}{x_1x_2}=\frac{\frac{-b}{a}}{\frac{c}{a}}=-\frac{b}{c}=-\frac{-13}{-36}$

$=\boxed{-\frac{13}{36}}$

7

$$x^2-2tx+t^2=0$$

If x_1 and x_2 are solution of the equation above and $x_1+x_2=x_1\cdot x_2$, what is the value of t?

A) -2
B) -1
C) 1
D) 2

Solution:

$x_1+x_2=x_1\cdot x_2$

$-\frac{-2t}{1}=\frac{t^2}{1}$

$2t=t^2$

$t^2-2t=0$

$t(t-2)=0 \Rightarrow \boxed{t=2}$

$t=0$

8

$$2+\sqrt{2x+11}=x$$

What are the solutions to the equation above?

A) $\{7\}$
B) $\{1,7\}$
C) $\{-7,-1\}$
D) $\{-1,7\}$

Solution:

$\sqrt{2x+11}=x-2$

$2x+11=x^2-4x+4$

$x^2-6x-7=0$

$(x-7)(x+1)=0$

$x=7$ and $x=-1$

check:

$\sqrt{2\cdot7+11}=7-2$

$5=5$

TRUE

check:

$\sqrt{2(-1)+11}=-1-2$

$3=-3$

False

CONTINUE

9

$$x^2+(3m-1)x+24=0$$

In the equation above, m is a constant. If $x=3$ is a solution of this equation, what other value of x satisfies the equation?

A) -8
B) 3
C) 6
D) 8

Solution:

$x=3$; $x^2+(3m-1)x+24=0$

$x_1 x_2 = \frac{c}{a} = \frac{24}{1} = 24$

$3x_2 = 24$

$x_2 = 8$

10

$$\frac{x-3}{x+2}=\frac{1}{2x-2}$$

In the equation above, if $x>1$, what is the solution of the equation?

A) 1
B) 2
C) 3
D) 4

Solution:

$(x-3)(2x-2) = (x+2)(1)$

[$x \neq -2$ and $x \neq 1$]

$2x^2-8x+6 = x+2$

$2x^2-9x+4 = 0$

$x \quad -4$

$2x \quad -2$

$(x-4)(2x-2)=0$

$x=4$; ~~$x=1$~~

11

Which of the following are solutions to the quadratic equation $\sqrt{2x^2-14x+21}+4=x$?

A) $\{-1,1\}$
B) $\{5\}$
C) $\{4,5\}$
D) $\{1,2\}$

Solution:

$\sqrt{2x^2-14x+21} = x-4$

$2x^2-14x+21 = x^2-8x+16$

$x^2-6x+5=0$

$(x-5)(x-1)=0$

$x=5$; ~~$x=1$~~

Check:

$\sqrt{2(5)^2-14\cdot 5+21}$

$= 5-4$

$1=1$

TRUE ✓

Check:

$\sqrt{2\cdot 1^2-14\cdot 1+21}$

$= 1-4$

$3=-3$

false x

12

In the equation $mx^2+3m^2x-6=0$, m is a constant. If $x_1+x_2=6$, what is a possible value of $x_1 \cdot x_2$?

A) -3
B) -2
C) 3
D) 6

Solution:

$x_1+x_2 = -\frac{3m^2}{m} = -3m = 6$

$m=-2$

$x_1 x_2 = \frac{c}{a} = -\frac{6}{m} = \frac{-6}{-2} = 3$

CONTINUE

13

$$\frac{x^2+7x-8}{x^2-3x+2}=0$$

What are the solutions to the equation above?

A) $\{1,2\}$

B) $\{-8,1\}$

C) $\{-8,1,2\}$

D) $\{-8\}$

Solution:

$$\frac{(x+8)(x-1)}{(x-2)(x-1)}=0$$

$(x+8)(x-1)=0$ and $(x-2)(x-1)\neq 0$

$x=-8$; $x=1$ and $x\neq 2$; $x\neq 1$

$x=1$ conflict

$x=-8$

14

If $3m^2+15m+12=0$, what is the possible value of m?

A) $-\frac{4}{3}$

B) -1

C) $\frac{4}{3}$

D) 4

Solution:

$3m^2+15m+12=0$

$m^2+5m+4=0$

$(m+4)(m+1)=0$

$m=-4$; $m=-1$

15

$$\frac{y+1}{2}=\frac{3}{y+2}$$

What are the solutions to the equation above?

A) $\{-1,4\}$

B) $\{-1,-4\}$

C) $\{1,-4\}$

D) $\{1,4\}$

Solution:

$(y+2)(y+1)=3\cdot 2 \Rightarrow [y\neq -2]$

$y^2+3y+2=6$

$y^2+3y-4=0$

$(y+4)(y-1)=0$

$y=-4$; $y=1$

16

$$\frac{x^2-3x+2}{x^2+5x-6}=0$$

What are the solutions to the equation above?

A) $\{2\}$

B) $\{-6,1\}$

C) $\{-1\}$

D) $\{6\}$

Solution:

$$\frac{(x-2)(x-1)}{(x+6)(x-1)}=0$$

$(x-2)(x-1)=0$ and $(x+6)(x-1)\neq 0$

$x=2$; $x=1$ and $x\neq -6$; $x\neq 1$

conflict

CONTINUE

1

What are the solutions to $2x^2 + 5x + 3 = 0$?

A) $\left\{-\frac{1}{2}, 3\right\}$

B) $\left\{\frac{1}{2}, 3\right\}$

C) $\left\{-1, \frac{1}{3}\right\}$

D) $\left\{-\frac{2}{3}, -1\right\}$

Solution:

$2x^2 + 5x + 3 = 0$

$x \quad 1$

$2x \quad 3$

$(x+1)(2x+3) = 0$

$x = -1 \quad ; \quad x = -\frac{3}{2}$

2

If the quadratic equation $ax^2 - (3a-1)x + 1 = 0$ has two equal roots, what could be the value of a?

A) $\frac{1}{8}$

B) $\frac{1}{6}$

C) $\frac{1}{4}$

D) 1

Solution:

$\Delta = 0$

$(3a-1)^2 - 4 \cdot a \cdot 1 = 0$

$9a^2 - 6a + 1 - 4a = 0$

$9a^2 - 10a + 1 = 0$

$a \quad -1$

$9a \quad -1$

$(a-1)(9a-1) = 0$

$a = 1 \quad ; \quad a = \frac{1}{9}$

3

If -1 is one of the zeros of the equation $(m+1)x^2 - 7x + 3m - 4 = 0$, what is the value of the m?

A) -2

B) -1

C) 0

D) 1

Solution:

$x_1 = -1$

$(m+1)(-1)^2 - 7(-1) + 3m - 4 = 0$

$m + 1 + 7 + 3m - 4 = 0$

$4m = -4$

$m = -1$

4

A rectangle has length 4 cm greater than width. If the area is 96 cm^2, what is the perimeter of rectangle?

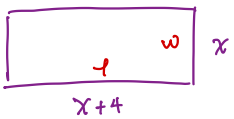
A) 20

B) 24

C) 40

D) 48

Solution:



Area $= l \cdot w = x(x+4) = 96$

$x = 8$

perimeter $= 2(l+w) = 2(8+12)$

$= 40$

CONTINUE

5

When a tennis ball is hit directly upwards, its height h above the ground is given by $h = 2 + 6t - t^2$ meters, where t is the time in seconds after the ball is hit. When is the ball height of 11 meters?

A) 2
B) 3
C) 6
D) 11

Solution:

$h = 2 + 6t - t^2$

$h = 11 \Rightarrow 11 = 2 + 6t - t^2$

$t^2 - 6t + 9 = 0$

$(t-3)^2 = 0$

$t = 3$

6

A baker baking cake finds that his profit per hour, $\$P$, $P = 36d - d^2$, where d is the number of cake made per hour. How many cake must the company make per hour in order to make \$320 profit?

A) 12
B) 15
C) 20
D) 24

Solution:

$320 = 36d - d^2$

$d^2 - 36d + 320 = 0$

$(d-16)(d-20) = 0$

$d = 16$ or $d = 20$

7

What are the solutions to $x^4 - 17x^2 + 16 = 0$?

A) $\{-4, -1, 1, 4\}$
B) $\{-4, 4\}$
C) $\{1, 16,\}$
D) $\{-1, 1, 16\}$

Solution:

$x^4 - 17x^2 + 16 = 0$

$(x^2-1)(x^2-16) = 0$

$x^2 = 1$; $x^2 = 16$

$x = \mp 1$ $x = \mp 4$

$\{-4, -1, 1, 4\}$

8

$$x + \frac{36}{x} = 12$$

In the equation above, if $x > 0$, what is the solution of the equation?

A) 6
B) 9
C) 12
D) 36

Solution:

$\frac{x^2 + 36}{x} = 12$

$\frac{x^2 - 12x + 36}{x} = 0$

$(x-6)^2 = 0$

$x = 6$ and $x \neq 0$

CONTINUE

9

What are the solutions to $6x^2 + 5x = 4 - 7x - 3x^2$?

A) $\frac{2\pm 2\sqrt{2}}{3}$

B) $\frac{2\pm 12\sqrt{2}}{3}$

C) $\frac{-12\pm 2\sqrt{2}}{18}$

D) $\frac{-2\mp 2\sqrt{2}}{3}$

Solution:

$9x^2 + 12x - 4 = 0$

$\Delta = 144 - 4(9)(-4) = 288$

$x_{1,2} = \frac{-12 \mp \sqrt{288}}{2 \cdot 9} = \frac{-12 \mp 12\sqrt{2}}{18}$

$= \boxed{\frac{-2 \mp 2\sqrt{2}}{3}}$

10

$$\sqrt[3]{t^2 + 15} + x = 11$$

In the equation above, if $x = 7, and\ t > 0$, what is the value of t?

A) -7

B) 7

C) 14

D) 49

Solution:

$\sqrt[3]{t^2+15} + 7 = 11$

$\sqrt[3]{t^2+15} = 4$

$t^2 + 15 = 64$

$t^2 = 49$

$t = \mp 7$

$t > 0$; $\boxed{t = 7}$

11

$$ax^3 + bx^2 + cx + d = 0$$

In the equation above, $a, b, c, and\ d$, constant. If the equation has roots $-5, -3, and\ 4$, which of the following is a factor of $ax^3 + bx^2cx + d = 0$?

A) $x - 5$

B) $x - 3$

C) $x + 4$

D) $x - 4$

Solution:

roots $-5, -3$ and 4

$(x+5)(x+3)(x-4) = ax^3 + b^2x + cx + d$

12

What are the solutions to $x + \sqrt{x} = 6$?

A) $\{-3, 2\}$

B) $\{4, 9\}$

C) $\{-3, 2, 4, 9\}$

D) $\{4\}$

Solution:

$x + \sqrt{x} - 6 = 0$

$\sqrt{x} = t \Rightarrow x = t^2$

$t^2 + t - 6 = 0$

$(t+3)(t-2) = 0$

$t = -3$; $t = 2$

$\sqrt{x} = -3$ $\sqrt{x} = 2$

No solution $\boxed{x = 4}$

CONTINUE

13

What are the solutions to $\frac{x^2-x-20}{x^2-2x-24} = 0$?

A) $\{-4, 5\}$
B) $\{-4, 5, 6\}$
C) $\{5\}$
D) $\{5, 6\}$

Solution:

$\frac{(x-5)(x+4)}{(x-6)(x+4)} = 0$

$(x-5)(x+4)=0$

$x = 5 \; ; \; x = -4$

$(x+6)(x-4)=0$

$x \neq -6 \; ; x \neq 4$

conflict

$x = 5$

14

What are the solutions to $x^3 + x^2 - 4x - 4 = 0$?

A) $\{-2, 2\}$
B) $\{-2, -1, 2\}$
C) $\{-1, 1, 4\}$
D) $\{-1, 1\}$

Solution:

$x^2(x+1) - 4(x+1) = 0$

$(x^2-4)(x+1) = 0$

$x^2 - 4 = 0$ and $x + 1 = 0$

$x = \mp 2$ $x = -1$

$\{-2, -1, 2\}$

15

If -2 is one of the roots of the equation $3x^2 - (a-b)x - 6 = 0$, what is the value of the other root of the equation?

A) 3
B) 1
C) -1
D) -3

Solution:

$x_1 = -2 \; ; \; x_1 x_2 = \frac{c}{a} = \frac{-6}{3}$

$x_1 x_2 = -2$

$-2 x_2 = -2$

$x_2 = 1$

16

$x^2 + \sqrt{2}x - 4 = 0$

A) $\sqrt{2}$
B) $-\sqrt{2}$
C) 4
D) -4

Solution:

$x_1 x_2 = \frac{c}{a}$

$a = 1, \; b = \sqrt{2}, \; c = -4$

$x_1 x_2 = \frac{-4}{1} = -4$

CONTINUE

1

$$f(x)=mx^2+24$$

For the function f defined above, m is a constant and $f(-4)=8$. What is the value of $f(4)$?

A) -8
B) -1
C) 4
D) 8

Solution:

$f(x)= mx^2+24$

$f(-4)=8 \Rightarrow m(-4)^2+24=8$

$16m=-16 \Rightarrow m=-1$

$f(x)= -x^2+24$

$f(4)= -4^2+24 = -16+24$

$f(4)= 8$

2

$$g(x)=\frac{1}{(x-3)^2+4(x-3)+4}$$

For what value of x is the function g above undefined?

A) -2
B) -1
C) 1
D) 2

Solution:

Undefined means denominator is zero.

$(x-3)^2+4(x-3)+4=0$

$x^2-6x+9+4x-12+4=0$

$x^2-2x+1=0$

$(x-1)^2=0$

$x=1$

3

A function f satisfies $f(3)=11$ and $f(5)=6$.
A function g satisfies $g(3)=4$ and $g(6)=3$
What is the value of $f(g(f(5)))$?

A) 3
B) 4
C) 6
D) 11

Solution:

$f(g(f(5))) \Rightarrow f(5)=6$

so $f(g(6)) \Rightarrow g(6)=3$

so $f(3)=11$

4

$$y=a(x-3)(x+5)$$

In the quadratic equation above, a is nonzero constant. The graph of the equation in the $xy-$ plane is parabola with vertex (h,k). Which of the following is equal to k?

A) $-16a$
B) $-12a$
C) $12a$
D) $16a$

Solution:

$y=a(x-3)(x+5)$

$x_1=3 \quad , \quad x_2=-5$

$h=\frac{x_1+x_2}{2}=\frac{3-5}{2}=-1$

$k=f(h)=f(-1)=a(-1-3)(-1+5)$

$f(-1)=-16a$

$k=-16a$

CONTINUE

5

In the $xy-$ plane is parabola with equation $y=f(x)=(x-8)^2$ intersects the line with the equation $y=9$ at two points, M and N. What is the length of $\overline{MN}$?

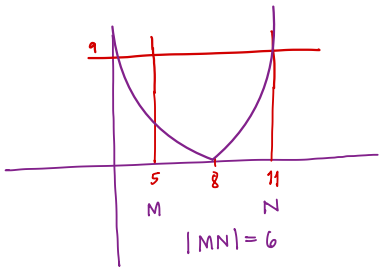
A) 5
B) 6
C) 11
D) 16

Solution:

$y=(x-8)^2$, $y=9$

$(x-8)^2=9$

$x-8=\mp 3$ → $x=11$, $x=5$



6

x	1	2
$f(x)$	-1	1

The table above shows some values of the linear function f. Which of the following defines f?

A) $2x-3$
B) $2x-1$
C) $2x+1$
D) $2x+3$

Solution:

$f(x)=mx+n$

$f(1)=-1$; $f(2)=1$

$m+n=-1$; $2m+n=1$

$m+n=-1$

$-(2m+n=1)$

$-m=-2$

$m=2$ → $n=3$

$f(x)=2x-3$

7

$$f(x)=\frac{2}{3}x+n$$

In the function above, n is a constant. If $f(6)=9$, what values of $f(-3)$?

A) -2
B) 3
C) 5
D) 7

Solution:

$f(6)=9$

$\frac{2}{3}6+n=9$

$n=5$

$f(x)=\frac{2}{3}x+5$

$f(-3)=\frac{2}{3}(-3)+5$

$f(-3)=3$

8

If $f(x)=-3x+7$, what values of $f(-2x)$?

A) $f(x)=-6x+7$
B) $f(x)=6x+7$
C) $f(x)=-6x+3$
D) $f(x)=6x+3$

Solution:

$f(x)=-3x+7$

$f(-2x)=-3(-2x)+7$

$f(-2x)=6x+7$

CONTINUE

9

In the $xy-$ plane, the graph of function f has $x-$ intercepts at $-2,\ 1, and\ 4$. Which of the following could define f ?

A) $f(x)=(x-2)(x+1)(x+4)$

B) $f(x)=(x+2)(x+1)(x-4)$

C) $f(x)=(x-2)(x-1)(x+4)$

D) $f(x)=(x+2)(x-1)(x-4)$

Solution:

x-intercept at -2, 1 and 4 are zeros of f functin.

so

$f(x)=(x+2)(x-1)(x-4)$

10

$$h(x)=(x-6)(x+4)$$

Which of the following is an equivalent form of the function above in which the minimum value of h appears as a constant?

A) $h(x)=(x-1)^2+25$

B) $h(x)=(x-1)^2-23$

C) $h(x)=(x-1)^2-25$

D) $h(x)=x^2-23$

Solution:

$h(x) = x^2 - 2x - 24$

$= x^2 - 2x + 1 - 1 - 24$

$h(x) = (x-1)^2 - 25$

11

x	2	4	6
$f(x)$	11	17	23

The table above shows some values of the linear function f. Which of the following defines f ?

A) $2x-5$

B) $2x+5$

C) $3x-5$

D) $3x+5$

Solution:

$f(2)=11;\ f(4)=17;\ f(6)=23$

$f(x) = mx+n$

$2m+n=11$

$-(4m+n=17)$

$-2m=-6$

$m=3$

$n=5$

$f(x)=3x+5$

12

In the equation $y=x^2-m$ and m is a positive constant the graph of the equation is a parabola. Which of the followingt is an equivalent form of the equation?

A) $y=(x-m)(x+m)$ $\longrightarrow x^2-m^2$

B) $y=(x-\sqrt{m})(x+\sqrt{m})$ $\longrightarrow x^2-m$

C) $y=(x-m)^2-m$ $\longrightarrow x^2-2mx+m^2-m$

D) $y=\left(x-\frac{m}{2}\right)\left(x+\frac{m}{2}\right)$ $\longrightarrow x^2-\frac{m^2}{4}$

CONTINUE

13

In the $xy-$ plane, the point $(2,3)$ lies on the graph of the function g. If $g(x)=-x^2+t$, where t is a constant, what is the value of t?

A) -4
B) -1
C) 3
D) 7

Solution:

$y=g(x)=-x^2+t \;;(2,3)$

$3=-2^2+t$

$t=7$

14

x	1	4	5
$g(x)$	12	27	32
$h(x)$	18	24	26

The table above shows some values of the functions g and h and g. For which values of x is $g(x)=h(x)$?

A) -2
B) -1
C) 3
D) 6

Solution:

$g(x)=mx+n$
$g(1)=12\;;\; g(4)=27$

$m+n=12$
$-(4m+n=27)$
$-3m=-15$
$m=5$
$n=7$ } $g(x)=5x+7$

$h(x)=ax+b$
$h(1)=18\;;\; h(4)=24$

$a+b=18$
$-(4a+b=24)$
$-3a=-6$
$a=2$
$b=16$ } $h(x)=2x+16$

$h(x)=g(x) \Rightarrow 5x+7=2x+16$

$3x=9$

$x=3$

15

x	1	4	6
$h(x)$	-2	13	33

The table above shows some values of the linear function h. Which of the following defines $h(3)$?

A) 5
B) 8
C) 9
D) 12

Solution:

$h(x)=mx+n$

$h(1)=-2\;;\; h(4)=13$

$m+n=-2$
$-(4m+n=13)$
$-3m=-15$

$m=5$
$n=-7$ } $h(x)=5x-7$

$h(3)=5\cdot 3-7=8$

16

In the *xy-plane,* the graph $f(x)=2x^2-9x$ intersects the graph of the $y=-x$ at the points (0,0) and *(m,-m)*. What is the value of m?

A) 4
B) 6
C) 8
D) 9

Solution:

$f(x)=2x^2-9x \rightarrow y=-x$ at (0,0) and (m,n)

(0,0) and (m,-m) are intersection of functions.

$f(m)=-m$

$-m=2m^2-9m$

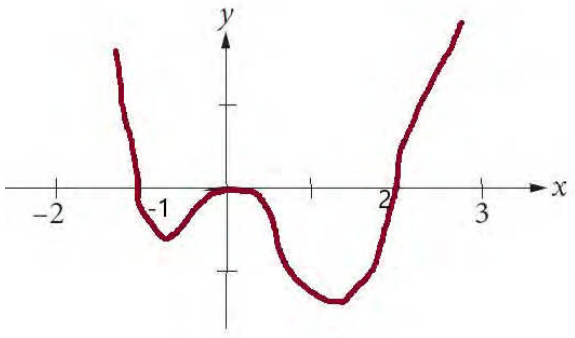
$2m^2-8m=0$

$2m(m-4)=0$

$m=0$ or $m=4$

CONTINUE

1



Which of the following could be equation of the graph above?

A) $y=(x-1)(x+1)(x-2)$

B) $y=x^2(x+1)(x-2)$

C) $y=x(x-1)(x+2)$

D) $y=x^2(x-1)(x+2)$

Solution:

x-intercepts are $-1, 0,$ and 2

$y=(x+1)(x)(x-2)x$

2

$$f(x)=3x-7$$

$$g(x)=\frac{4-f(x)}{3}$$

The functions f and g are defined above. What value of $g(3)$?

A) -2

B) $-\frac{2}{3}$

C) $\frac{2}{3}$

D) 3

Solution:

$$g(3)=\frac{4-f(3)}{3}=\frac{4-(3\cdot 3-7)}{3}$$

$$=\frac{4-2}{3}$$

$$=\boxed{\frac{2}{3}}$$

3

$$h(x)=\frac{4}{x^2+x-12}$$

For what value of x is the function g above undefined?

A) -4

B) -3

C) 1

D) 4

Solution:

$x^2+x-12=0$

$(x+4)(x-3)=0$

$x=-4$; $x=3$

↓

Makes g function undefined

4

$$f(x)=\frac{1}{2}(x+2)^2-6$$

$$g(x)=-x-8$$

The functions f and g are defined above. If $f(a)=g(a)$, what is possible value of a ?

A) -3

B) -2

C) 2

D) 4

Solution:

$f(a)=g(a)$

$\frac{1}{2}(a+2)^2-6=-a-8$

$(a+2)^2-12=-2a-16$

$a^2+4a+4-12+2a+16=0$

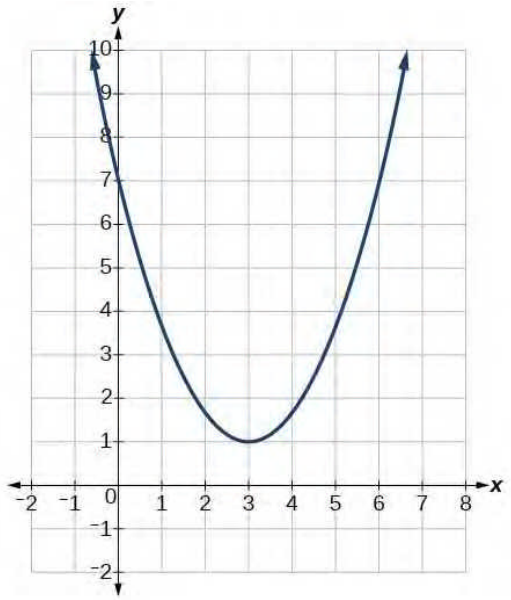
$a^2+6a+8=0$

$(a+4)(a+2)=0$

$a=-4$; $\boxed{a=-2}$

CONTINUE

5



The graph above shows f in the $xy-planes$. Which of the following defines f ?

A) $y=\frac{1}{3}x^2+4x+7$

B) $y=-\frac{2}{3}x^2+4x+7$

C) $y=\frac{2}{3}x^2-4x+7$

D) $y=\frac{2}{3}x^2+4x+7$

Solution:

V(3,1) and (0,7)

$y=a(x-3)^2+1$ $\quad a=\frac{2}{3}$

$7=a(9)+1$ $\quad y=\frac{2}{3}(x-3)^2+1$

6

If $f(x)=3x^2+3$ and $f(x-a)=3x^2-12x+15$, what is the value of a ?

A) -3

B) -1

C) 1

D) 2

Solution:

$f(x)=3x^2+3$

$f(x-a)=3(x-a)^2+3$

$=3(x^2-2ax+a^2)+3$

$=3x^2-6ax+3a^2+3 \quad =3x^2-12x+15$

$-6a=-12 \Rightarrow a=2$

7

In the $xy-plane$, the graph of the polynomial function g crosses the $x-axis$ at exactly two points, $(m,0)$ and $(n,0)$, where m and n are both negative. Which of the following could define g ?

A) $g(x)=(x+m)(x+n)$

B) $g(x)=(x-m)(x-n)$

C) $g(x)=(x-m)(x+n)$

D) $g(x)=(x+m)(x-n)$

Solution:

$g(x)=a(x-m)(x-n)$

8

If $f(x)=5x^2+7x+2$ is graphed in the $xy-plane$, which of the following characteristics of the graph is displayed as a constant or coefficient in the equation?

A) $y-$ intercept

B) $x-$ intercept(s)

C) $y-$ coordinate of the vertex

D) $x-$ intercept of the line of symmetry

Solution:

Constant on the equation is 2.

It is y-intercept

CONTINUE

9

In the $xy-plane$, the graph of function $h(x)=x^2+6x+8$ has two $x-$ intercepts. What is the distance between the $x-$ intercepts?

A) 4
B) 3
C) 2
D) 1

Solution:

$h(x) = x^2+6x+8$

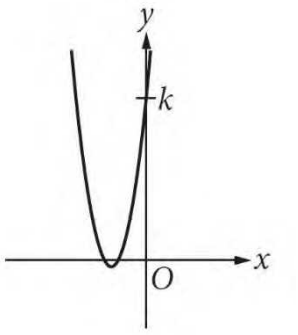
$x^2+6x+8=0$

$(x+4)(x+2)=0$

$x=-4$; $x=-2$

2 is the distance of the points

10



In the $xy-plane$, the graph of $g(x)=x^2+7x+11$ is shown above. If the function crosses the $y-axis$ at point $(0,k)$, what is the value of k?

A) 4
B) 7
C) 10
D) 11

Solution:

$(0,k) \rightarrow g(0) = 0^2+7(0)+11$

$g(0) = 11$

$k = 11$

11

If $f(x)=\frac{3x-5}{x+5}$, what is the value of $f(0)$?

A) -10
B) -5
C) -1
D) 1

Solution:

$f(0)=\frac{3(0)-5}{0+5} = -1$

12

If $f(x)=3^x-2^x$, what is the value of $f(3)-f(2)$?

A) 19
B) 14
C) 13
D) 11

Solution:

$f(3)-f(2) = (3^3-2^3)-(3^2-2^2)$

$= (27-8)-(9-4)$

$= 19-5$

$= 14$

CONTINUE

1

If $f(x)=\dfrac{3x^2+4x-1}{2x+3}$, what is $f(-2)$?

A) -6

B) -3

C) 3

D) 6

Solution:

$$f(-2)=\frac{3(-2)^2+4(-2)-1}{2(-2)+3}$$

$$=\frac{12-8-1}{-4+3}$$

$$=\frac{3}{-1}=\boxed{-3}$$

2

$$g(x)=x^2+6x+8$$

The graph of the g in the $xy-$plane is a parabola. Which of the following intervals contains the $x-$coordinate of the vertex of the graph of g ?

A) $-6<x<-5$

B) $-4<x<-2$

C) $-2<x<0$

D) $2<x<4$

Solution:

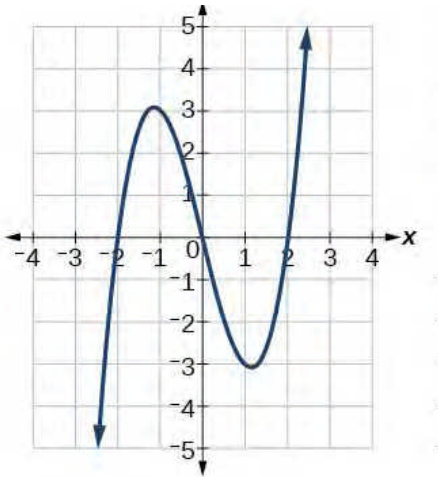
$x^2+6x+8=0$

$(x+4)(x+2)=0$

$x=-4$ and $x=-2$ are $x-$ intercepts so vertex

$\boxed{-4<x<-2}$

3



Which of the following could be the equation of the graph above?

A) $y=(x-2)(x+2)$

B) $y=x^2(x-2)(x+2)$

C) $y=x(x-2)(x+2)$

D) $y=x(x-2)^2(x+2)$

Solution:

$x-$ intercepts are $-2, 0, 2$

$\boxed{y=(x+2)(x-2)x}$

4

$$f(x)=2x^2-3x$$
$$g(x)=5-2f(x)$$

The functions f and g are defined above. What is value of $g(-1)$?

A) -5

B) 1

C) 5

D) 15

Solution:

$g(-1)=5-2f(-1)$

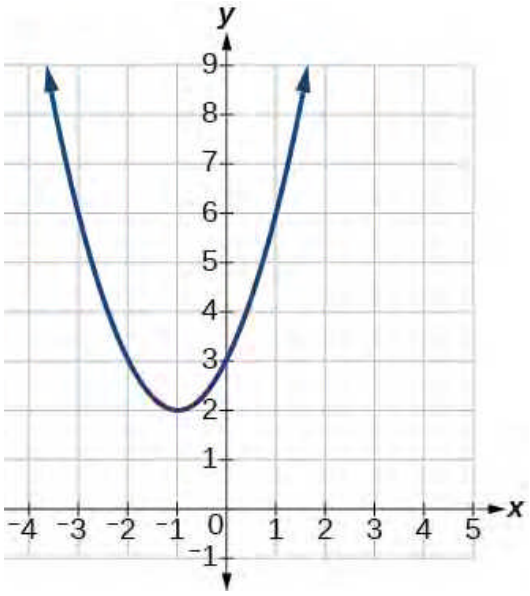
$=5-2(2(-1)^2-3(-1))$

$=5-2(2+3)$

$\boxed{g(-1)=-5}$

CONTINUE

5



The graph above shows f in the $xy-planes$. Which of the following defines f ?

A) $y=3(x+1)^2+2$

B) $y=2(x+1)^2+3$

C) $y=(x+1)^2+2$

D) $y=(x+2)^2+3$

Solution:

v(-1, 2)

(0, 3)

$y=a(x+1)^2+2$

$3=a(1)^2+2$

$a=1$

$y=(x+1)^2+2$

6

If $h(x)=x^2+2$ and $h(x+k)=x^2-6x+11$, what is the value of k ?

A) -3

B) -1

C) 0

D) 3

Solution:

$h(x+k)=(x+k)^2+2$

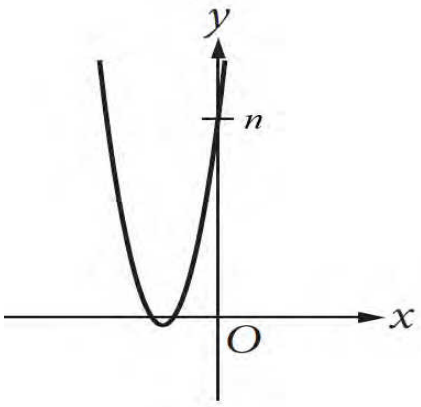
$=x^2-6x+11$

$=(x-3)^2+2$

$(x+k)^2+2=(x-3)^2+2$

$k=-3$

7



In the $xy-$plane, the graph of $g(x)=3x^2+11x+7$ is shown. If the graph crosses the $y-$ axis at point $(0,n)$, what is the value of n?

A) $-\frac{11}{6}$

B) 3

C) 6

D) 7

Solution:

$g(0)=n$

$3(0)^2+11(0)+7=n$

$n=7$

8

In the $xy-$plane, the graph of function $g(x)=x^2-x-6$ has two $x-$ intercepts. What is the distance between the $x-$ intercepts?

A) 6

B) 5

C) 2

D) 1

Solution:

$x^2-x-6=0$

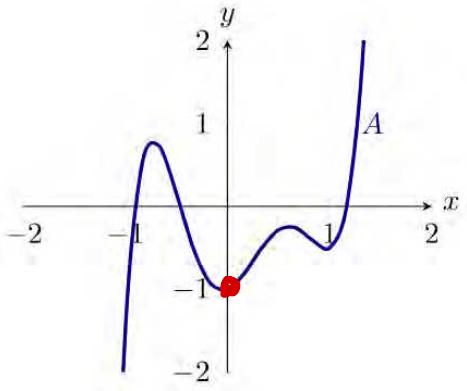
$(x-3)(x+2)=0$

$x=3$ and $x=-2$

distance between x-intercepts are 5

CONTINUE

9



In the $xy-$ plane, the graph of f is shown above. Which of the following defines $f(0)$?

A) -1
B) 0
C) 1
D) 2

Solution:

$f(0) = -1$

10

If $f(x) = 6x - 5$, what is the value of $f^{-1}(2)$?

A) $\frac{7}{6}$
B) $\frac{6}{7}$
C) $\frac{1}{7}$
D) 7

Solution:

$f^{-1}(2) = m \Rightarrow f(m) = 2$

$6m - 5 = 2$

$m = 7/6$

11

If $f(x) = \frac{3^{x+2}}{x+1}$, what is the value of $f(2)$?

A) 9
B) 18
C) 27
D) 81

Solution:

$f(2) = \frac{3^{2+2}}{2+1}$

$= \frac{3^4}{3}$

$= 27$

12

If $f(x-3) = x^2 + 6x + 11$ for all real values of x which of the following is equal to $f(x)$?

A) $x^2 - 2$
B) $x^2 - 2$
C) $(x+3)^2 + 2$
D) $(x+6)^2 + 2$

Solution:

$f(x-3) = x^2 + 6x + 11$

$f(x-3) = x^2 + 6x + 9 + 2$

$f(x-3) = (x+3)^2 + 2$

$f(x+3-3) = (x+3+3)^2 + 2$

$f(x) = (x+6)^2 + 2$

CONTINUE

1

If $f(x)= 5x+ k$, where k is a constant, and $f(-2) = -4$. What is value of k ?

A) -6

B) -4

C) 4

D) 6

Solution:

$f(-2) = -4$

$5(-2) + k = -4$

$-10 + k = -4$

$k = 6$

2

If $f(x)= 1- x^2$, and m is a positive real number, then $f\left(\frac{1}{m}\right)$?

A) $1+ \frac{1}{m^2}$

B) $\frac{(m+1)(m+1)}{m^2}$

C) $\frac{(m- 1)(m+ 1)}{m^2}$

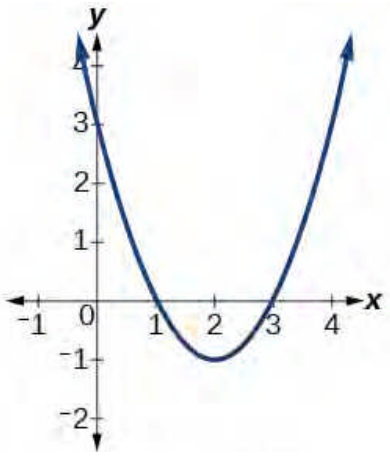
D) $\frac{1- m^2}{m^2}$

Solution:

$f\left(\frac{1}{m}\right) = 1 - \frac{1}{m^2} = \frac{m^2-1}{m^2}$

$= \frac{(m-1)(m+1)}{m^2}$

3



Which of the following could be the equation of the graph above?

A) $f(x)= x^2 + 2x+ 3$

B) $f(x)= x^2 - 4x+ 3$

C) $f(x)= x^2 + 4x+ 3$

D) $f(x)= x^2 - 5x+ 3$

Solution: $x_1 = 1$, $x_2 = 3$, $(0,3)$

$y = f(x) = a(x-1)(x-3)$

$3 = a(-1)(-3) \Rightarrow a = 1$

$y = (x-1)(x+3)$

$y = x^2 - 4x + 3$

4

The functions f is defined by the equation $f(x)= x^2 - x$. Which of the following represents a quadratic equation with no real zeros?

Solution:

A) $f(x)- 1 \rightarrow x^2 - x - 1 = 0$; there is roots

B) $f\left(\frac{x}{2}\right) \rightarrow \frac{x^2}{4} - \frac{x}{2} = 0$; there is roots

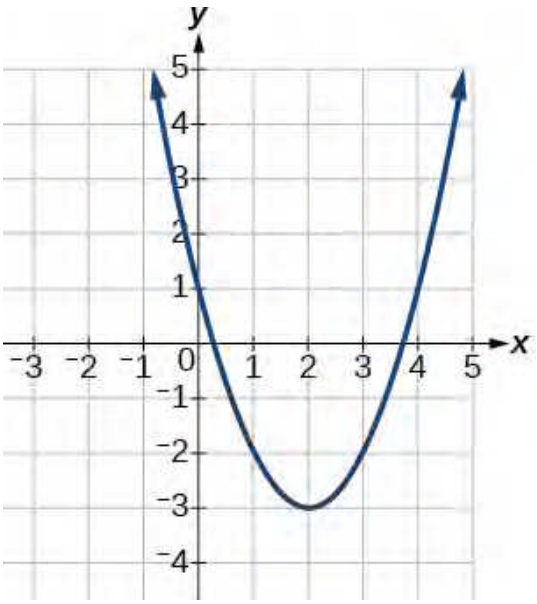
C) $f\left(\frac{2x-1}{2}\right) \rightarrow \left(\frac{2x-1}{2}\right)^2 - \frac{2x-1}{2} = 0$; there is roots

D) $f(x)+ 3 \rightarrow x^2 - x + 3 = 0$; No real roots

$\Delta < 0$

CONTINUE

5



The graph above shows f in the xy- planes. Which of the following defines f ?

A) $y = x^2 - 4x + 1$

B) $y = \frac{1}{2}(x - 2)^2 - 3$

C) $y = 2(x - 2)^2 - \frac{3}{2}$

D) $y = 4(x - 2)^2 - 3$

Solution:

v (2, -3) and (0, 1)

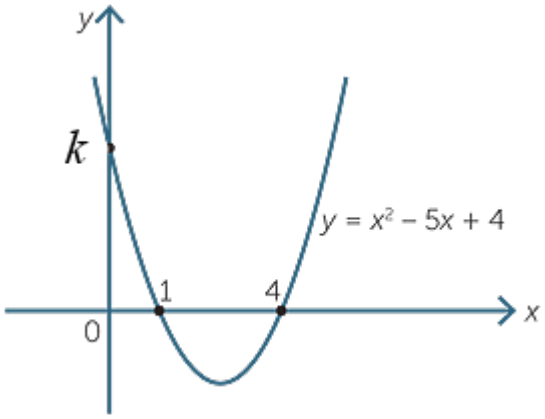
$y = a(x-2)^2 - 3$

$1 = a(-2)^2 - 3 \Rightarrow a = 1$

$y = (x-2)^2 - 3$

$y = x^2 - 4x + 1$

6



In the xy- plane, the graph of $y = f(x)$ is shown. If the graph crosses the y- axis at point $(0, k)$, what is the value of k ?

A) $\frac{5}{2}$

B) 3

C) 4

D) 5

Solution:

$y = x^2 - 5x + 4$; $(0, k)$

$k = 0^2 - 5(0) + 4$

$k = 4 \rightarrow$ y-intercept

CONTINUE

7

If $f(x) = -x + 5$ and $g(f(x)) = 4x - 7$, what is value of $g(3)$?

A) -7
B) -1
C) 1
D) 7

Solution:

$g(f(x)) = 4x - 7$

$g(-x+5) = 4x - 7$

3

$x = 2 \longrightarrow$ plug in

$g(-2+5) = 4(2) - 7$

$g(3) = 1$

8

In the xy- plane, the graph of function with zeros at $x = 3$ and $x = 5$ and vertex at $(4, -1)$. What is the y- intercept of the graph?

A) -15
B) -8
C) 8
D) 15

Solution:

$y = a(x-3)(x-5)$; $(4, -1)$

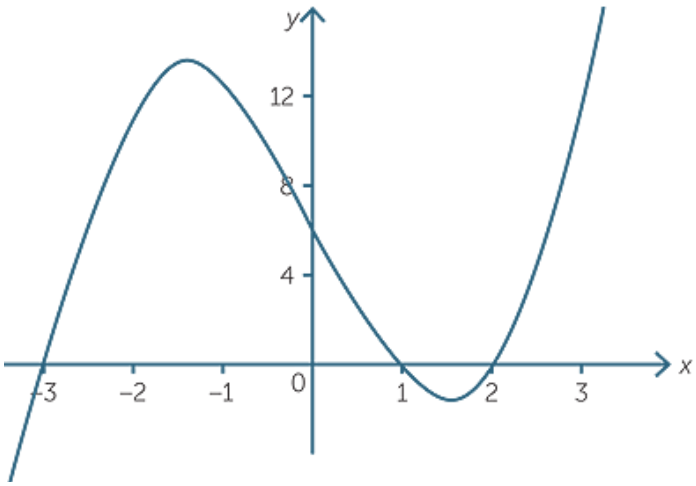
$-1 = a(4-3)(4-5) \Rightarrow a = 1$

$y = (x-3)(x-5)$

$x = 0$; $y = (-3)(-5)$

$y = 15 \rightarrow y$- intercept

9



In the $xy-$ plane, the graph of f is shown above. Which of the following defines $f(x)$?

A) $y = x^3 - 7x + 6$
B) $y = (x-3)(x+1)(x+2)$
C) $y = x^2 - 2x + 1$
D) $y = x^3 - 6x + 7$

Solution:

x- intercepts or $-3, 1,$ and 2

$y = (x+3)(x-1)(x-2) = x^3 - 7x + 6$

10

Let the function f be defined by $f(x) = 3 - |x-5|$ for all real values of x. What is the greatest value of f?

A) -2
B) 3
C) 5
D) 8

Solution:

$f(x) = 3 - |x-5|$

Absolute value is always positive.

for greatest value of f, $|x-5| = 0$

so the greatest value of f is 3.

CONTINUE

1

If $f(x) = x^2 - x$, what is the value of $f(-1) + f(1) + f(2)$?

A) 7
B) 6
C) 5
D) 4

Solution:

$f(-1) = (-1)^2 - (-1) = 2$

$f(1) = 1^2 - 1 = 0$

$f(2) = 2^2 - 2 = 2$

$f(-1) + f(1) + f(2) = 4$

2

If $g(x) = 3x + 2$, and $f(x) = x^2 + 2$, what is the value of $g(f(2))$?

A) 8
B) 12
C) 20
D) 24

Solution:

$g(f(2)) = g(2^2+2)$

$= g(6) = 3 \cdot 6 + 2$

$= 20$

3

If $f(x) = 3^{2x-1}$, and $f(2) = 5m + 2$, what is the value of m ?

A) 1
B) 3
C) 4
D) 5

Solution:

$f(2) = 5m + 2$

$3^{2 \cdot 2 - 1} = 5m + 2$

$27 = 5m + 2$

$m = 5$

4

If $f(2x - 5) = x^2 + 2x - 1$, what is the value of $f(5)$?

A) 36
B) 34
C) 25
D) -1

Solution:

$f(2x-5) = x^2 + 2x - 1$

$f(5) \rightarrow x = 5$

$f(2(5)-5) = 5^2 + 2(5) - 1$

$f(5) = 34$

CONTINUE

5

$$f(x) = 3mx - 7$$

For the function f defined above, m is a constant and $f(2) = -13$. What is the value of $f(-2)$?

A) -1
B) 1
C) 13
D) 17

Solution:

$f(2) = -13$

$3m \cdot 2 - 7 = -13$

$6m = -6$

$m = -1$

$f(x) = -3x - 7$

$f(-2) = -3(-2) - 7 = 6 - 7 = \boxed{-1}$

6

$$h(x) = \frac{1}{x^4 - 13x^2 + 36}$$

For what value of x is the function h above undefined?

A) -9
B) -4
C) 3
D) 4

Solution:

$x^4 - 13x^2 + 36 = 0$

$(x^2 - 4)(x^2 - 9) = 0$

$x^2 = 4$ $\quad x^2 = 9$

$x = \mp 2$ $\quad x = \mp 3$

$\{-3, -2, 2, 3\}$

7

A function f satisfies $f(11) = 5, and\ f(3) = 1$.
A function g satisfies $g(5) = 11, and\ g(1) = 11$.
What is the value of $f(g(f(3)))$?

A) 11
B) 5
C) 3
D) 1

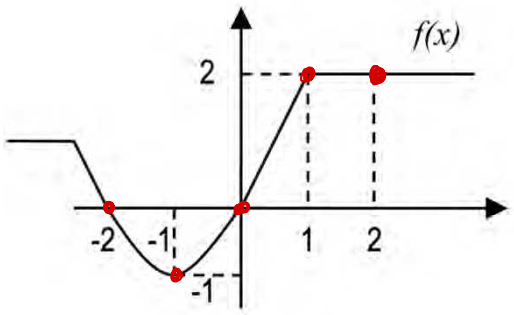
Solution:

$f(g(f(3))) \Rightarrow f(3) = 1$

$f(g(1)) \Rightarrow g(1) = 11$

$\boxed{f(11) = 5}$

8



The graph of function $f(x)$ is shown above, what is the value of $\frac{f(-1)+f(2)}{f(-2)+f(1)}$?

A) -1
B) $-1/2$
C) 1/2
D) 1

Solution:

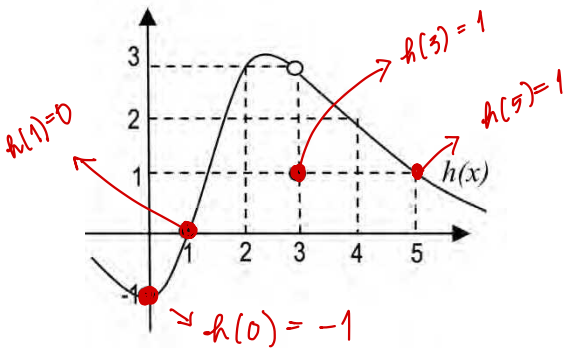
$f(-1) = -1$ $\quad f(-2) = 0$

$f(2) = 2$ $\quad f(1) = 2$

$= \frac{-1+2}{0+2} = \boxed{\frac{1}{2}}$

CONTINUE

9



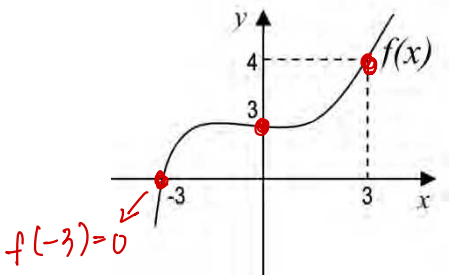
The graph of function $h(x)$ is shown above, what is the value of $\frac{h(0)+h(3)}{h(1)+h(4)}$?

A) -1
B) 0
C) 1
D) 3/2

Solution:

$h(0) = -1$ $h(1) = 0$
$h(3) = 1$ $h(4) = 2$
$\frac{-1+1}{0+2} = 0$

10



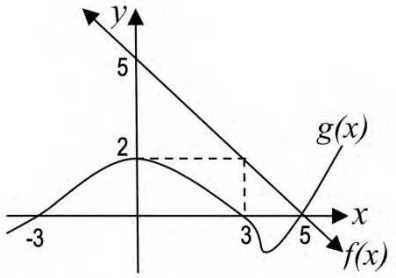
The graph of function $f(x)$ is shown above, what is the value of $f(f(0)) + f(-3)$?

A) -3
B) 0
C) 3
D) 4

Solution:

$f(f(0)) + f(-3)$
$\checkmark$ $\checkmark$
3 0
$f(3) + 0$
$4 + 0 = 4$

11



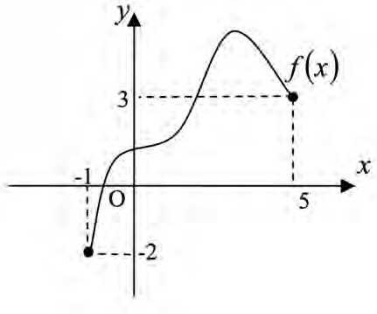
The graph of function $f(x)$, and $g(x)$ are shown above, what is the value of $g(f(0)) + f(3)$?

A) 2
B) 3
C) 5
D) 8

Solution:

$g(f(0)) + f(3)$
$= g(5) + 2$
$= 0 + 2$
$= 2$

12



The graph of function $f(x)$ is shown above, what is the value of $f(5) - f(-1)$?

A) -5
B) -1
C) 1
D) 5

Solution:

$f(5) - f(-1)$
$3 - (-2)$
$3 + 2 = 5$

CONTINUE

13

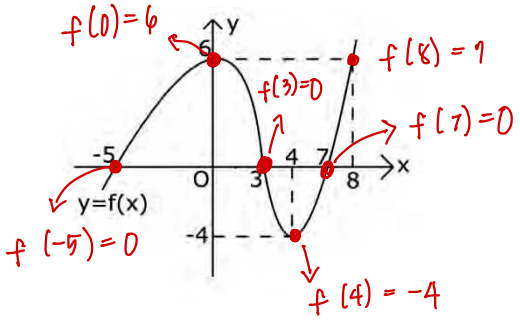
If $f(x) = \sqrt{x+1}$, what is the value of $f(3) + f(15) - f(24)$?

A) -1
B) 1
C) 6
D) 11

Solution:

$f(3) = \sqrt{3+1} = 2$
$f(15) = \sqrt{15+1} = 4$
$f(24) = \sqrt{24+1} = 5$
$2+4-5 = -1$

14



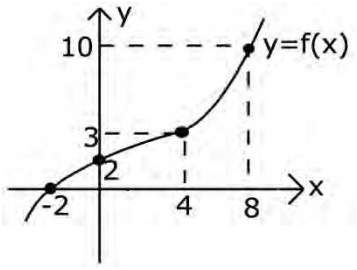
The graph of function $f(x)$ is shown above, and $f(f(-5)) + f(m) = 2$, what is the value of m?

A) 0
B) 3
C) 4
D) 8

Solution:

$f(f(-5) + f(m)) = 2$
$f(0) + f(m) = 2$
$6 + f(m) = 2 \Rightarrow f(m) = -4$
$m = 4$

15



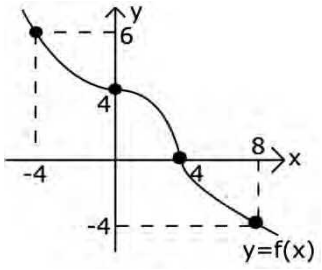
The graph of function $f(x)$ is shown above, and $g(x) = 2f(x-2) - 1$, what is the value of $g(f(8))$?

A) 19
B) 20
C) 21
D) 25

Solution:

$g(f(8)) = g(10) = 2 \cdot f(10-2) - 1$
$= 2f(8) - 1$
$= 2(10) - 1$
$= 19$

16



The graph of function $f(x)$ is shown above, and $f(4-n) + 6 = f(f(8))$, what is the value of n?

A) -2
B) -1
C) 0
D) 4

Solution:

$f(4-n) + 6 = f(-4)$
$f(4-n) + 6 = 6$
$f(4-n) = 0$
$4 \Rightarrow 4-n = 4$
$n = 0$

CONTINUE

1

In the $xy-plane$, $f(x)=(x-3)^2$ intersects the line with the equation $y=16$ at points A, and B. What is the length of $|AB|$?

A) 6
B) 7
C) 8
D) 11

Solution:

$(x-3)^2=16$

$x-3=\mp 4 \begin{cases} x=7 \\ x=1 \end{cases}$

$|AB|=7-(-1)=8$

2

In the $xy-plane$, graph of function f has $x-intercepts$ at $-1,\ 0, and\ 2$. Which of the following could define f?

A) $f(x)=x(x-1)(x+2)$
B) $f(x)=x(x+1)(x-2)$
C) $f(x)=x(x+1)^2(x+2)$
D) $f(x)=x(x-1)(x-2)$

Solution:

$f(x)=(x+1)(x)(x-2)$

$x=-1\ ;\ x=0\ ;\ x=2$

3

$$f(x)=(x-2)(x+4)$$

Which of the following is an equivalent form of the function above in which the minimum value of f appears as a constant?

A) $f(x)=(x+1)^2+9$
B) $f(x)=(x+1)^2-9$
C) $f(x)=(x-1)^2-9$
D) $f(x)=(x-1)^2+9$

Solution:

$f(x)=x^2-2x-8$

$=x^2-2x+1-1-8$

$f(x)=(x-1)^2-9$

4

In the $xy-plane$, point $(1,4)$ lies on the graph of function f. If $f(x)=-2x^2+mx$, where m is constant. What is the value of m?

A) 1
B) 3
C) 4
D) 6

Solution:

$(1,4)$ lies on $f(x)=-2x^2+mx$

$-2(1)^2+m\cdot 1=4$

$m=6$

CONTINUE

5

In the $xy-plane$, the graph of function $f(x) = -x^2 + x + 12$, has two $x-intercepts$. What is the distance between the $x-intercepts$?

A) -7
B) 1
C) 4
D) 7

Solution:

$-x^2 + x + 12 = 0$

$x^2 - x - 12 = 0$

$(x-4)(x+3) = 0$

$x = 4$ and $x = -3$

distance between x-intercepts is 7

6

$$f(x) = -x^2 - 2x + 15$$

The graph of the f in the $xy-plane$ is a parabola. Which of the following intervals contains the $x-coordinate$ of the vertex of the graph of f?

A) $-5 < x < 3$
B) $-3 < x < 5$
C) $-1 < x < 16$
D) $-3 < x < -1$

Solution:

$-x^2 - 2x + 15 = 0$

$x^2 + 2x - 15 = 0$

$(x+5)(x-3) = 0$

$x = -5$; $x = 3$

Vertex is between x-intercepts

so, $-5 < x < 3$

7

In the $xy-plane$, the graph $f(x) = -x^2 + 4x$ intersects the graph of the $y=x$ at the points $(0,0), and\ (n,n)$. What is the value of n?

A) -4
B) -3
C) 3
D) 5

Solution:

$f(x) = -x^2 + 4x$; $y = x$

$(0,0)$ and (n,n)

plug in (n,n) in $f(x)$

$n = -n^2 + 4n$

$n^2 - 3n = 0$

$n(n-3) = 0$

$n = 0$ $\quad n = 3$

8

$$h(x) = x^2 - x + 1$$
$$g(x) = -30 + 2h(x)$$

The functions h and g are defined above. What is value of g(-3)?

A) -4
B) 4
C) 9
D) 13

Solution:

$g(-3) = -30 + 2h(-3)$

$= -30 + 2((-3)^2 - (-3) + 1)$

$= -30 + 2(9 + 3 + 1)$

$= -30 + 26$

$g(-3) = -4$

CONTINUE

9

If $h(x) = x^2 - x$, and $h(x - t) = x^2 + 3x + 2$, what is the value of t ?

A) -2
B) 1
C) 2
D) 4

Solution:

$h(x-t) = (x-t)^2 - (x-t) = x^2 + 3x + 2$

$x^2 - 2tx + t^2 - x + t = x^2 + 3x + 2$

$x^2 - x(2t+1) + t^2 + t = x^2 + 3x + 2$

$-(2t+1) = 3$

$-2t - 1 = 3$

$-2t = 4$

$t = -2$

10

Let the function f be defined by $f(x) = 7 - 2|x - 3|$, for all real values of x. What is the greatest value of f?

A) 0
B) 4
C) 7
D) 13

Solution:

$f(x) = 7 - 2(x-3)$

Since absolute value is always positive, we can consider $2|x-3| = 0$

So, greatest value of f is 7.

11

If $f(x) = \frac{x^2-1}{x+1}$, what is the value of $\frac{f(-3)+f(3)}{f(0)}$?

A) -16
B) -2
C) 2
D) 4

Solution:

$$\frac{(-3)^2-1}{-3+1} + \frac{3^2-1}{3+1} = \frac{\frac{9-1}{-2} + \frac{9-1}{4}}{-1}$$

$$= \frac{-4+2}{-1} = \frac{-2}{-1} = 2$$

12

If $f(x) = \frac{3x-9}{x^2-3x}$, what is the value of $f(-1) + f(1)$?

A) -6
B) 0
C) 3
D) 6

Solution:

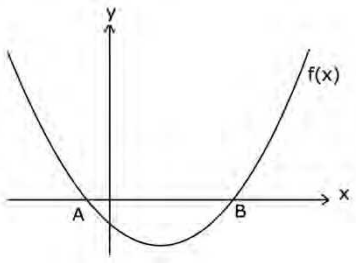
$$f(-1) = \frac{3(-1)(-9)}{(-1)^2 - 3(-1)} = \frac{-12}{1+3} = -3$$

$$f(1) = \frac{3(1)-9}{1^2 - 3(1)} = \frac{-6}{-2} = 3$$

$f(-1) + f(1) = -3 + 3 = 0$

CONTINUE

13



The graph of function $f(x)$ is shown above, $f(x) = x^2 - 2x + m$ intercepts at the points A, and B, and $|AB| = 4$, what is the value of m?

A) -3
B) -1
C) 1
D) 3

Solution:

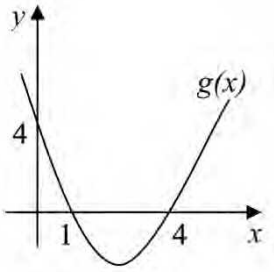
$x_1 + x_2 = -\frac{b}{a} = \frac{2}{1}$

$x_1 + x_2 = 2$
$x_2 - x_1 = 4$
$2x_2 = 6$
$x_2 = 3$

$AB = 4$
$x_2 - x_1 = 4$
$x_1 = -1$

$m = x_1 x_2$
$m = -1(3) = -3$

14



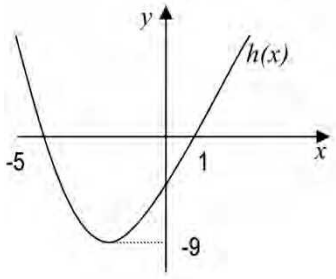
What is the equation of function shown above?

A) $g(x) = (x-1)(x-4)$
B) $g(x) = (x+1)(x-4)$
C) $g(x) = x^2 - 4x - 5$
D) $g(x) = 2x^2 + 4x + 5$

Solution:

$y = a(x-1)(x-4)$; $(0,4)$
$4 = a(-1)(-4) \Rightarrow a = 1$
$y = (x-1)(x-4)$
$y = x^2 - 5x + 4$ ✓

15



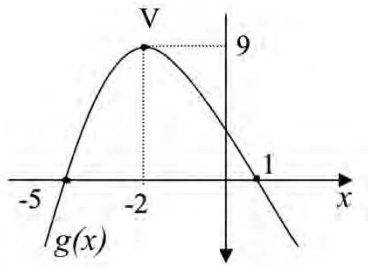
What is the equation of function shown above?

A) $h(x) = -x^2 - 4x - 5$
B) $h(x) = x^2 - 6x + 5$
C) $h(x) = (x-1)(x+5)$
D) $h(x) = x^2 - 3x + 6$

Solution:

$x_1 = -5$; $x_2 = 1$, $V(h,-9)$
$h = \frac{x_1 + x_2}{2} = \frac{-5+1}{2} = -2 \Rightarrow V(-2,-9)$
$y = a(x+5)(x-1)$; $(-2,-9)$
$-9 = a(-2+5)(-2-1)$; $a = 1$
$y = (x+5)(x-1) \Rightarrow y = x^2 + 4x - 5$

16



What is the equation of function shown above?

A) $g(x) = (x-1)(x-4)$
B) $g(x) = -x^2 - 4x - 5$
C) $g(x) = -x^2 - 4x + 3$
D) $g(x) = -x^2 - 4x + 5$

Solution:

$y = a(x+5)(x-1)$; $(-2,9)$
$9 = a(-2+5)(-2-1) \Rightarrow a = -1$
$y = -1(x+5)(x-1)$
$y = -x^2 - 4x + 5$

CONTINUE

Answer Key

Exponents & Square Roots

TEST 1	
1	C
2	B
3	D
4	D
5	B
6	A
7	B
8	A
9	D
10	D
11	A
12	C
13	B
14	D
15	B
16	C

TEST 2	
1	A
2	D
3	B
4	A
5	B
6	C
7	D
8	C
9	B
10	A
11	A
12	B
13	D
14	C
15	B
16	A

TEST 3	
1	B
2	D
3	B
4	A
5	C
6	D
7	B
8	C
9	C
10	B
11	C
12	D
13	C
14	B
15	A
16	B

TEST 4	
1	C
2	A
3	D
4	D
5	C
6	B
7	D
8	D
9	B
10	A
11	C
12	B
13	B
14	A
15	D
16	C

Polynomials

TEST 1	
1	B
2	D
3	B
4	C
5	C
6	D
7	D
8	A
9	B
10	C
11	D
12	C
13	B
14	D
15	C
16	A

TEST 2	
1	C
2	A
3	B
4	C
5	D
6	B
7	A
8	D
9	A
10	C
11	C
12	B
13	D
14	A
15	C
16	D

TEST 3	
1	D
2	C
3	C
4	B
5	C
6	B
7	A
8	D
9	C
10	A
11	B
12	C
13	D
14	A
15	A
16	D

TEST 4	
1	B
2	A
3	B
4	B
5	C
6	A
7	D
8	C
9	C
10	D
11	B
12	D
13	B
14	C
15	A
16	B

CONTINUE

Answer Key

Quadratic Equations

TEST 1	
1	C
2	B
3	B
4	D
5	A
6	B
7	B
8	C
9	D
10	A
11	B
12	C
13	D
14	D
15	A
16	A

TEST 2	
1	B
2	C
3	B
4	A
5	C
6	D
7	A
8	B
9	C
10	D
11	B
12	B
13	A
14	B
15	D
16	C

TEST 3	
1	D
2	D
3	B
4	D
5	C
6	A
7	C
8	D
9	A
10	C
11	B
12	B
13	A
14	D
15	C
16	D

TEST 4	
1	B
2	D
3	B
4	D
5	B
6	C
7	D
8	A
9	D
10	D
11	B
12	C
13	D
14	B
15	C
16	A

TEST 5	
1	B
2	D
3	B
4	C
5	B
6	C
7	A
8	A
9	D
10	B
11	D
12	D
13	C
14	B
15	B
16	D

Functions and Quadratic Functions

TEST 1	
1	D
2	C
3	D
4	A
5	B
6	A
7	B
8	B
9	D
10	C
11	D
12	B
13	D
14	C
15	B
16	A

TEST 2	
1	B
2	C
3	A
4	B
5	C
6	D
7	B
8	A
9	C
10	D
11	C
12	B

TEST 3	
1	B
2	B
3	C
4	A
5	C
6	A
7	D
8	B
9	A
10	A
11	C
12	D

TEST 4	
1	D
2	C
3	B
4	D
5	A
6	C
7	C
8	D
9	A
10	B

TEST 5	
1	D
2	C
3	D
4	B
5	A
6	C
7	B
8	C
9	B
10	D
11	A
12	D
13	A
14	C
15	A
16	C

TEST 6	
1	C
2	B
3	C
4	D
5	D
6	A
7	C
8	A
9	A
10	C
11	C
12	B
13	A
14	A
15	C
16	D

CONTINUE

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454 $m + 2 = m$ $2y$ $7 = 5k$