Algebra 2 Honors Summer School Final Exam 2016

(Test ID: ins700966)

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Simplify.

(Question 1)

1

$sin(\frac{\pi}{2})$

A 1

B 0

C $\frac{1}{2}$

D $\frac{\sqrt{2}}{2}$

2

The reciprocal of the secant function is ...

A Secant

B Cosecant

C Sine

D Cosine

3

The reciprocal of the cosecant function is ...

A Secant

B Cosecant

C Sine

D Cosine

4

The reciprocal of the cotangent function is ...

A Secant

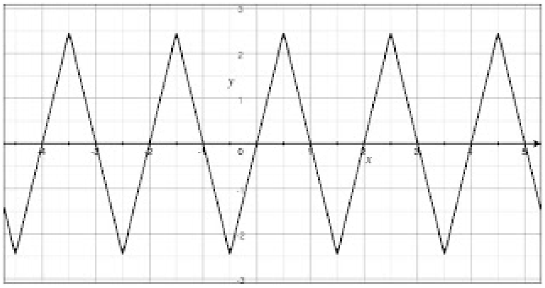
B Cosecant

C Tangent

D Cotangent

5

Is this function periodic? If so, identify the period.



A Yes, periodic. Period = 4

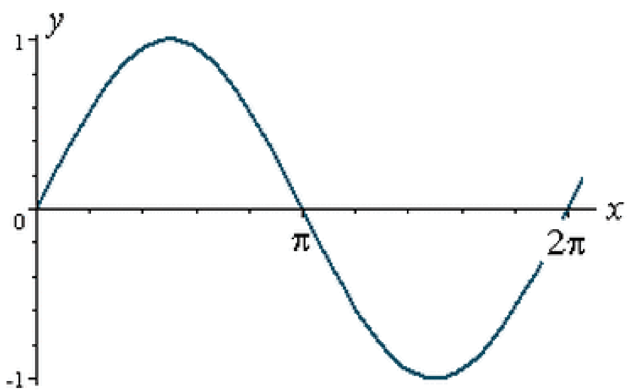
B No, not periodic.

C Yes, periodic. Period = 1

D Yes, periodic. Period = 2

6

Write the equation for this periodic function.



A y = tan θ

B y = cos θ

C y = sin θ

D y = csc θ

7

A particular sound wave can be graphed using the function y= -3 sin x. Find the amplitude and period of the function.

A amplitude = 3, period = 2π

B amplitude = $\frac{1}{2}\pi$, period = -3

C amplitude = 2π, period = 3

D amplitude = -3, period = 1/2

8

Which trigonometric functions have an amplitude of 3? Select all that apply.

A y = cos 3Θ

B y = 3 cos 2Θ

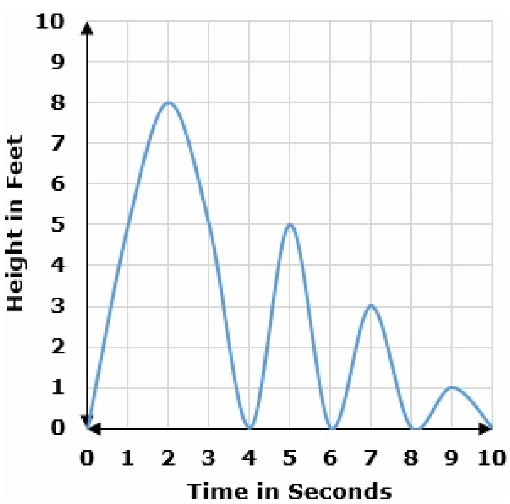
C y = sin 3Θ + 3

D y = -3 sin 5Θ

E y = cos (-3Θ + 3)

9

A ball was thrown up into the air and allowed to bounce until it came to a halt.



At which of the following intervals did the height of the ball increase and then decrease?

A $0 \le x \le 4$

B $2 \le x \le 4$

C $5 \le x \le 7$

D $7 \le x \le 9$

10

In the unit circle, what do the coordinates (x,y) represent?

A (x,y)
B (tan Θ, cot Θ)
C (sin Θ, cos Θ)
D (cos Θ, sin Θ)

11

Write $\frac{-7\pi}{4}$ radians in equivalent forms. Select all that apply.

A 315º
B -315º
C $\frac{\pi}{4}$
D 45º
E -45º
F $\frac{3\pi}{4}$

12

Write the measure in degrees.

$\frac{3\pi}{5}$ radians

A 108πº
B $\frac{\pi}{300}$º
C 108º
D 1.88º

13

Write the measure in radians. Express the answer in terms of ∏.

320º

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

B $\frac{9\pi}{16}$

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

D $\frac{16}{9\pi}$

14

Write -90º in equivalent forms. Select all that apply.

A 270º

B 90º

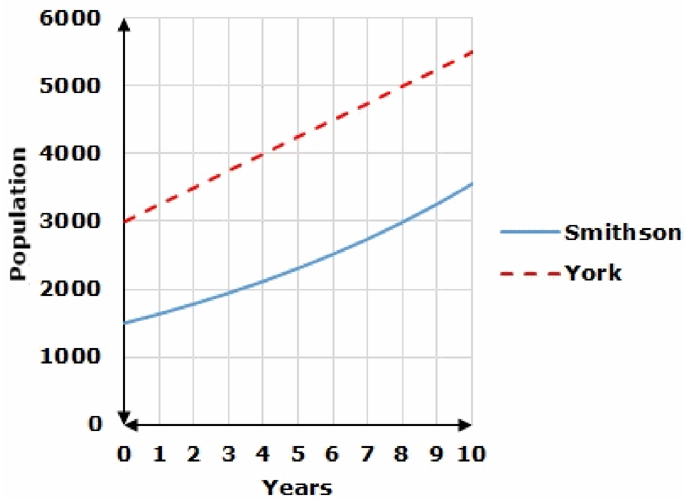
C $\frac{-\pi}{2}$

D $\frac{\pi}{2}$

E $\frac{3\pi}{2}$

F $\frac{-3\pi}{2}$

15



The town of Smithson and the town of York each were established at the same time. The graph above shows the growth rates between the two towns. If both towns continue to grow in population at the same rate, which town would have the larger population at year 30?

A Smithson will have the larger population because it is increasing linearly.

B Smithson will have the larger population because it is increasing exponentially.

C York will have the larger population because it is increasing linearly.

D York will have the larger population because it is increasing exponentially.

16

Which of the following functions has an exponential growth of 3%?

A $f(x) = 300(0.97)^x$

B $f(x) = 2500(3)^x$

C $f(x) = 1500(0.03)^x$

D $f(x) = 975(1.03)^x$

17

Select the equation that has an exponential decay of 6%.

A $f(x) = 6(1.06)^x$

B $f(x) = 1000(6)^x$

C $f(x) = 10{,}000(0.94)^x$

D $f(x) = 35(0.06)^{-x}$

18

Which of the following exponential functions represent exponential decay? Select *three* that apply.

A $y = (0.85)^x$

B $y = (1.01)^x$

C $y = (0.95)^{2x}$

D $y = 1.8(0.6)^x$

E $y = 0.25(1.5)^{3x}$

19

Which of the following functions represents an exponential growth of twenty–five percent?

A $f(x) = 125(25)^x$

B $f(x) = 15(2.5)^x$

C $f(x) = 35(1.25)^x$

D $f(x) = 2500(0.25)^x$

20

A university projects that from this point forward, its tuition will increase by 6% each year. Which of these statements are correct? Select *two* that apply.

A To find the university's projected tuition next year, you can add the product of 0.06 and the tuition of this year to the tuition of this year.

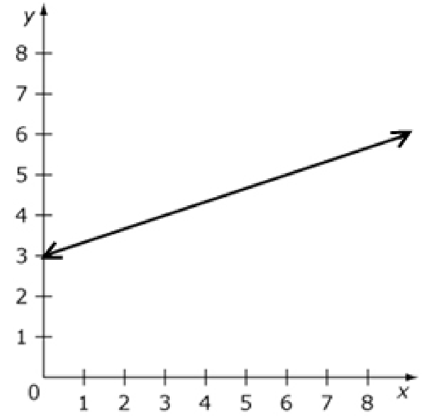
B To find the university's projected tuition next year, you can multiply the tuition this year by 1.06.

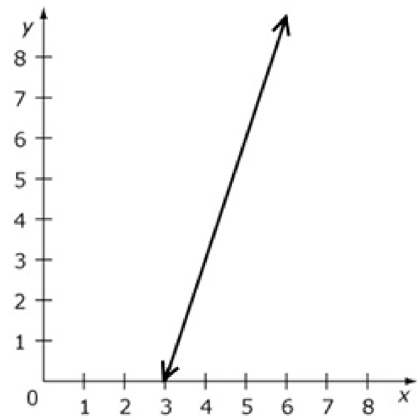
C To find the university's projected tuition in 2 years, you can add the product of 0.12 and the tuition of this year to the tuition of this year.

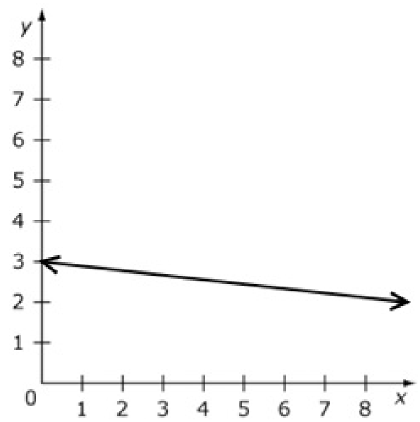
D To find the university's projected tuition in 2 years, you can multiply the tuition this year by 1.12.

21

Which of the following graphs has an *x*–intercept at 3?   Select *three* that apply.

A 

B 

C 

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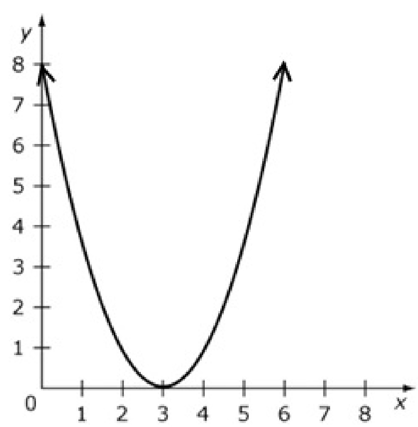
D 

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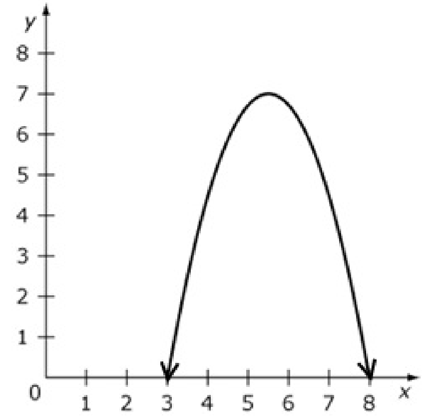

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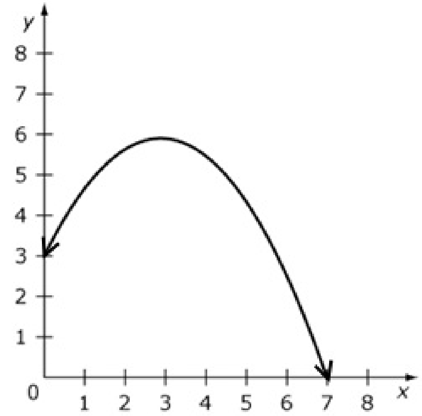
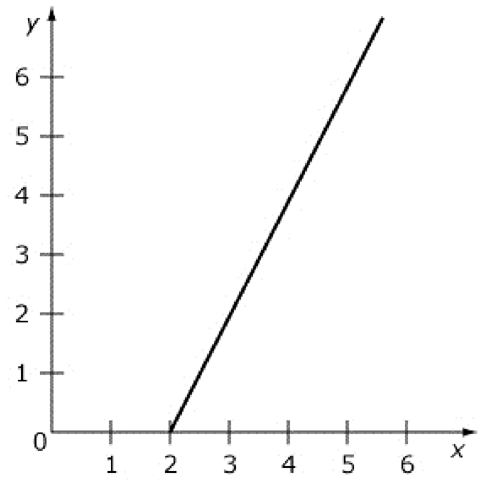


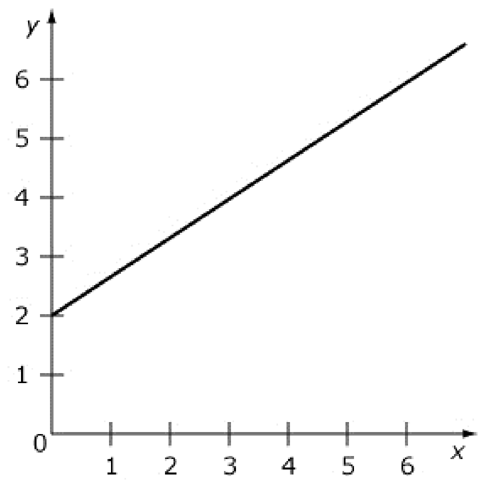
22

Which of the following graphs has a *y*–intercept at 2? Select two that apply.

A



B



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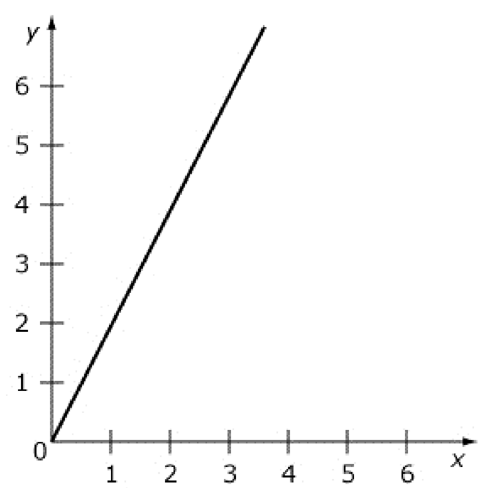
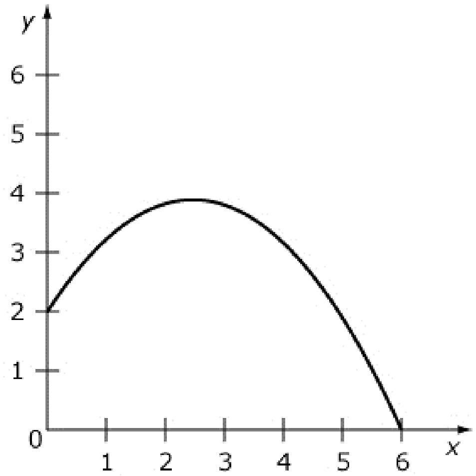
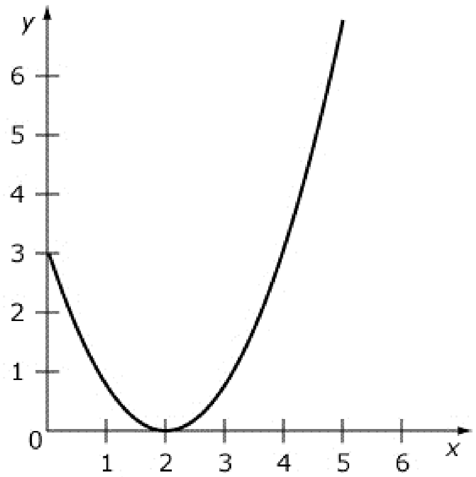
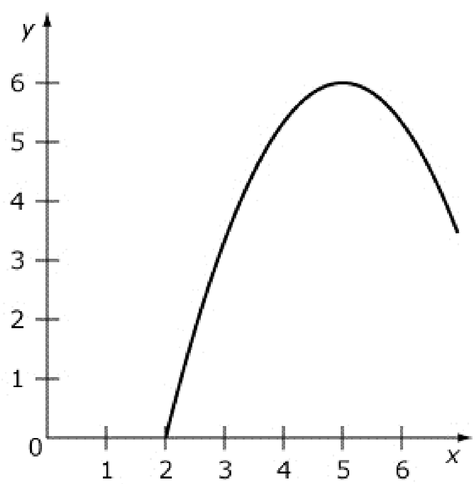


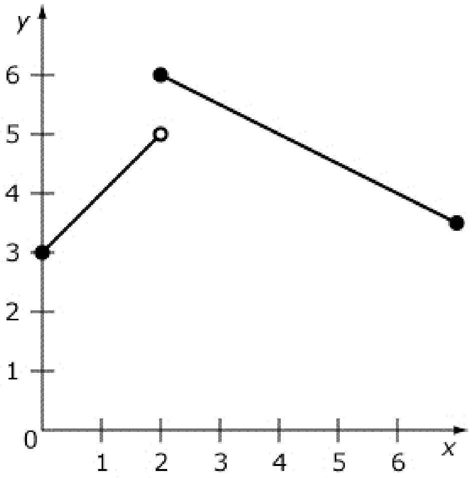
D 

E 

F 

23

For which of the following graphs is $f(2) = 5$? Select two that apply.

A


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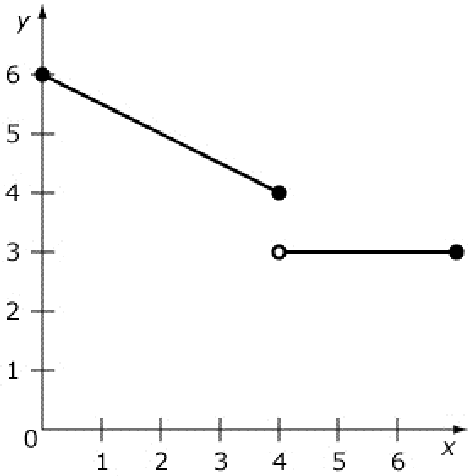
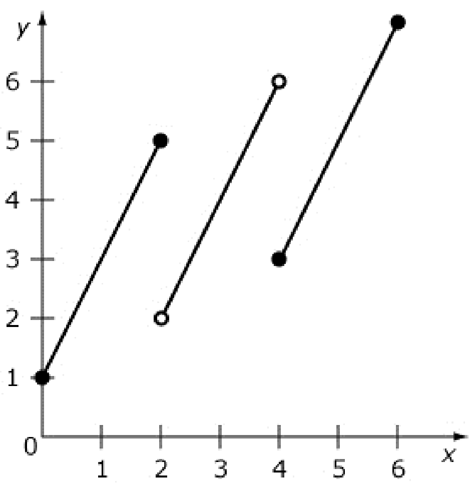
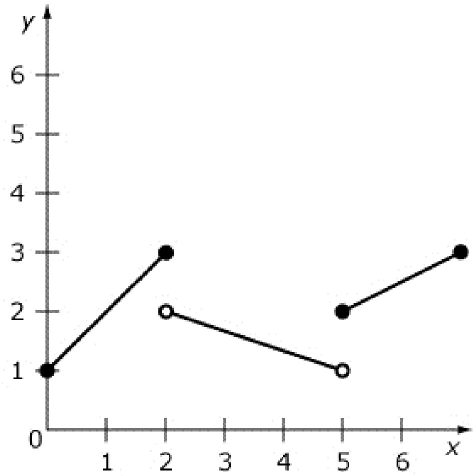
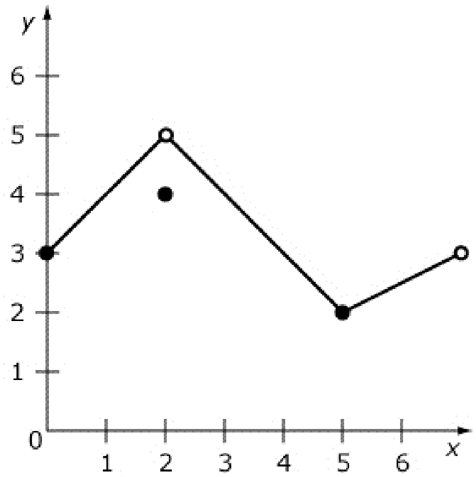
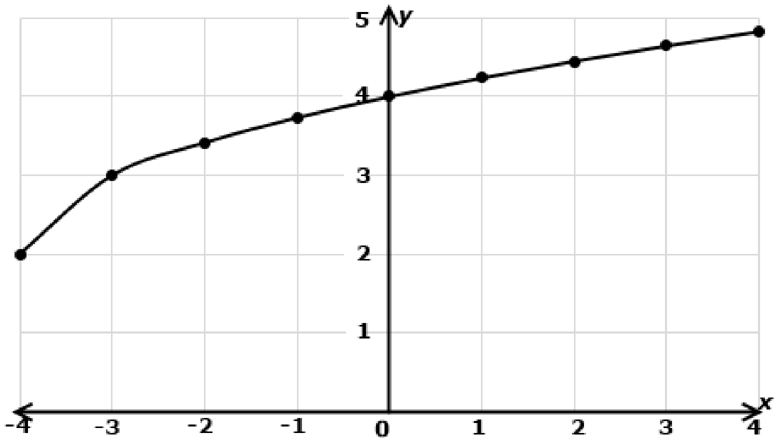


C


D 

E 

24



Select the equation that represents the graph above.

A $y = \sqrt{x+4} - 2$

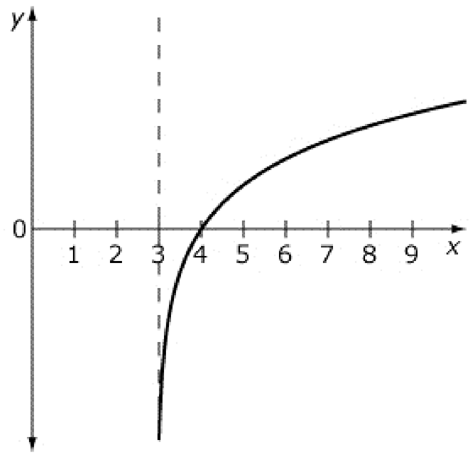
B $y = \sqrt{x-4}$

C $y = \sqrt{x-4+2}$

D $y = \sqrt{x+4} + 2$

25

Which of the following functions could correspond to the graph shown? Select two that apply.



A $f(x) = \log(x)$

B $f(x) = 4\log(x)$

C $f(x) = \log(x - 3)$

D $f(x) = \log(x - 4)$

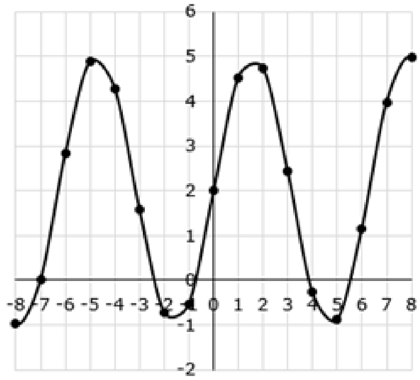
E $f(x) = 4\log(x - 3)$

F $f(x) = 3\log(x - 4)$

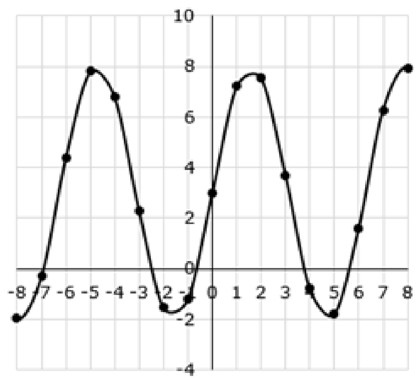
26

Which graph below has a midline about 2, an amplitude of about 4, and a period of about 7?

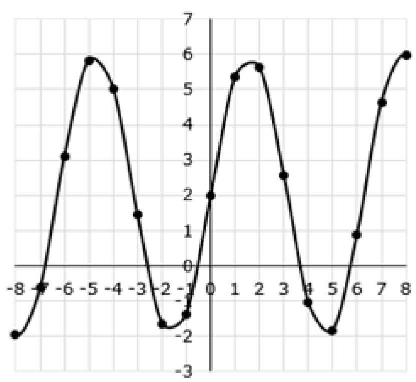
A



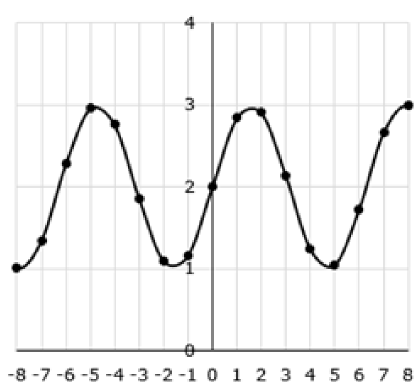
B



C



D



27

When does the value of sine = cosine?

A 30^{o}

B 45^{o}

C 60^{o}

D 135^{o}

E 225^{o}

F 270^{0}

G 315^{0}

H 360^{o}

28

When is the value of tangent undefined?

A 0^{o}

B 90^{o}

C 180^{o}

D 270^{o}

E 360^{o}

29

Which of the functions below has 0 in its domain?

A $f(x) = \frac{1}{x-4}$

B $f(x) = \frac{1}{x} - 4$

C $f(x) = \sqrt{x-4}$

D $f(x) = \frac{1}{\sqrt{x}}$

30

What angles have a sin value of 1/2 or -1/2?

A 0^{o}
B 30^{o}
C 60^{o}
D 150^{o}
E 180^{o}
F 200^{o}
G 210^{o}
H 330^{o}

31

For which values below does sine = $\frac{\sqrt{3}}{2}$ or $\frac{-\sqrt{3}}{2}$?

A $\frac{5\pi}{3}$
B $\frac{\pi}{2}$
C $\frac{3\pi}{4}$
D $\frac{2\pi}{3}$
E $\frac{\pi}{3}$
F $\frac{11\pi}{6}$

32

Evaluate the following expression.

$\log_5 25$

A 1
B 1/2
C 5
D 2

33

Evaluate the following expression.

$\log_4 32$

A 8

B 1/8

C 5/2

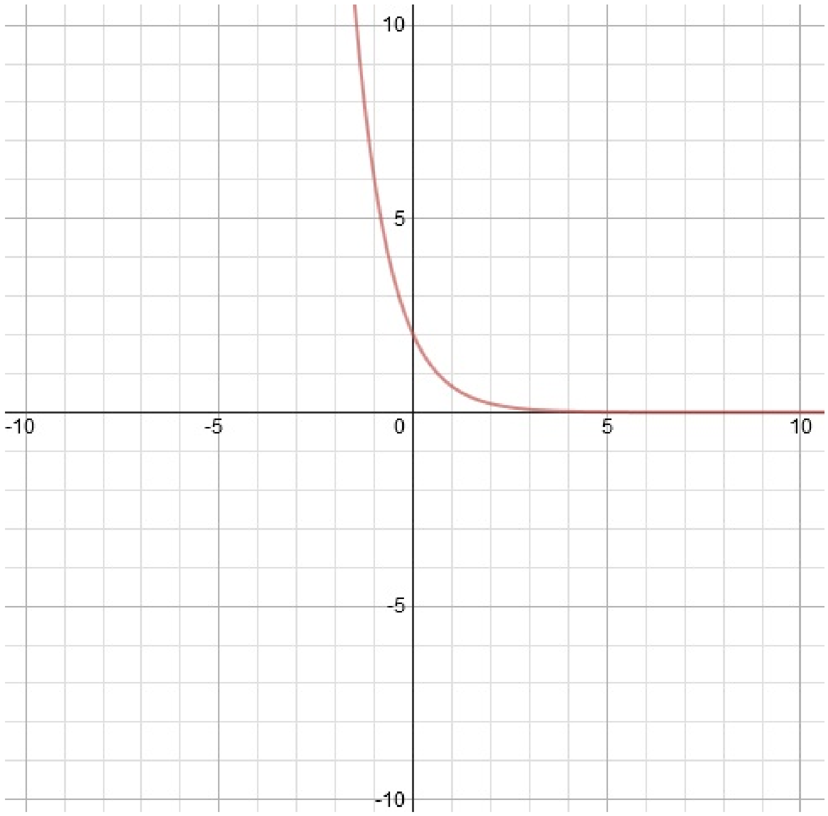
D 4

34

Identify the correct graph of

$f(x) = 2(3)^x$

A



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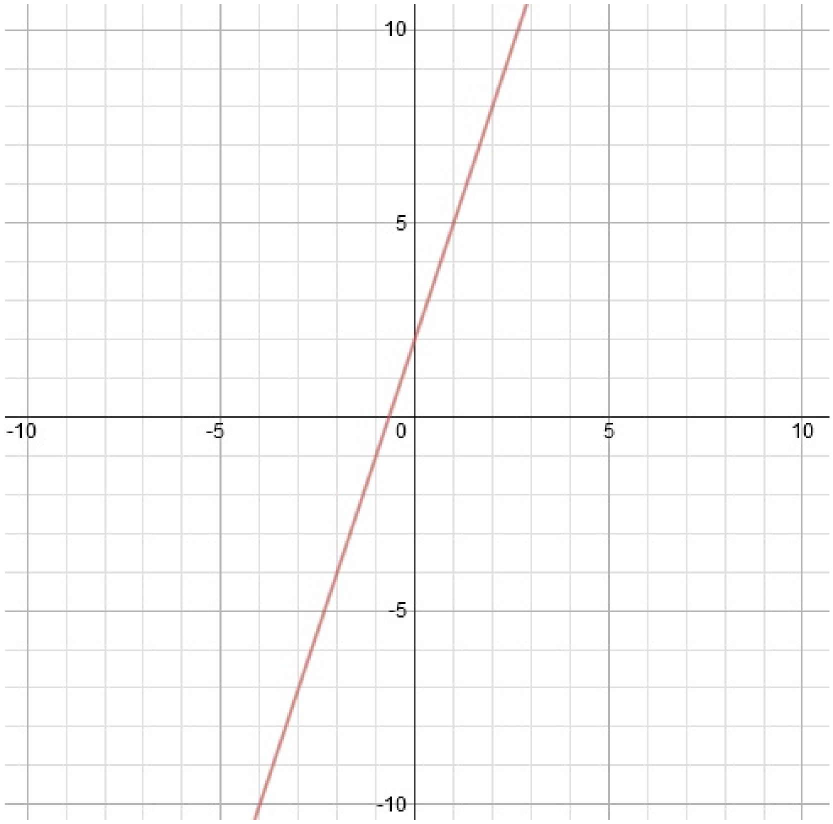
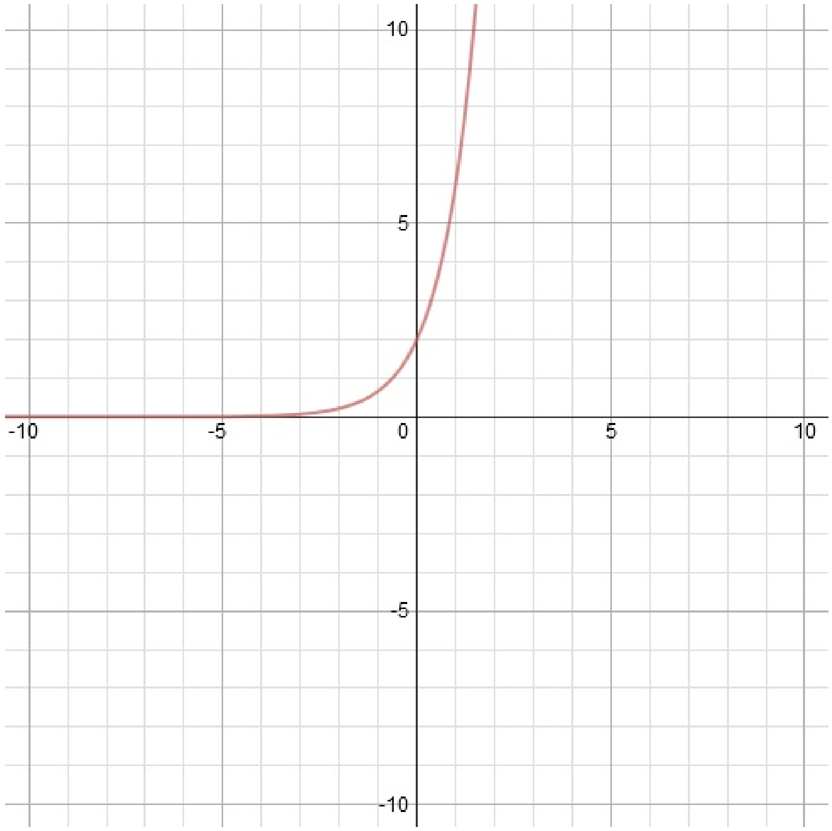
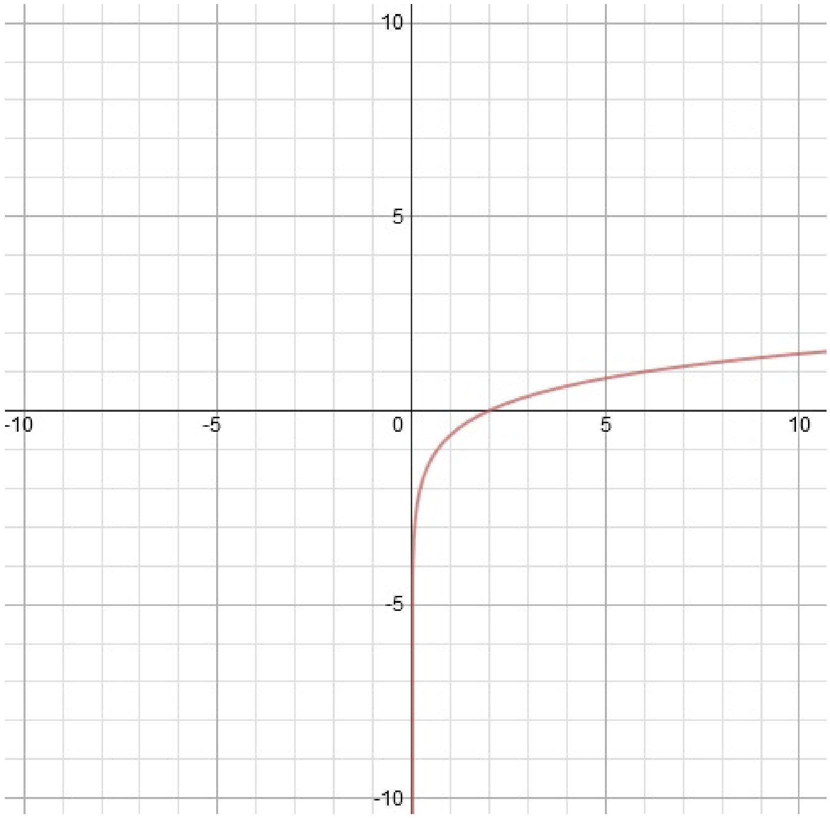
B



C



D



35

Subtract

$3\sqrt{3}-15\sqrt{3}$

A $-12\sqrt{3}$

B $18\sqrt{3}$

C $18\sqrt{6}$

D -1

E $12\sqrt{3}$

36

Which expresions simplify to the given square root?

(Check **ALL** that apply!)

$\sqrt{2}$

A $\sqrt{4}$

B $\frac{\sqrt{8}}{2}$

C $\frac{\sqrt{18}}{\sqrt{3}}$

D $\sqrt{\frac{36}{18}}$

E $\frac{\sqrt{18}}{3}$

37

Simplify

$\sqrt{108}$

A $3\sqrt{6}$

B $36\sqrt{3}$

C 54

D $3\sqrt{18}$

E $6\sqrt{3}$

38

A student claims that $\sin^2\theta + \cos^2\theta = 1$ can only be written one other way. First, decide if the student is correct. Next, justify your decision by either providing an example that supports or disproves the student's claim.

A The student is correct. The identity can only be rewritten as $\cos^2\theta = 1 - \sin^2\theta$.

B The student is correct. The identity can only be rewritten as $\cos^2\theta = 1 - \cos^2\theta$.

C The student is correct. The identity can only be rewritten as $\sin^2\theta = 1 - \cos^2\theta$ and $\cos^2\theta = 1 - \sin^2\theta$.

D The student is correct. The identity can only be rewritten as $\sin^2\theta = 1 - \cos^2\theta$ and $\sin^2\theta = 1 - \sin^2\theta$.

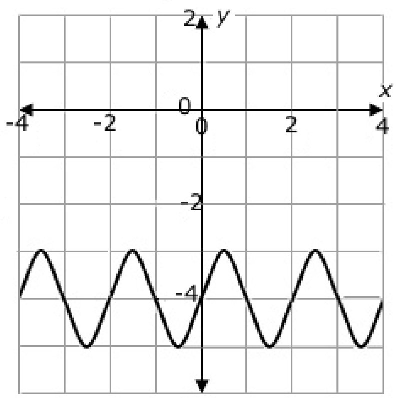
39

A student studying radio signals decided to focus in on a certain radio station to determine the graph of the radio signals used. The student determined that the radio station uses the following function for its radio signals.

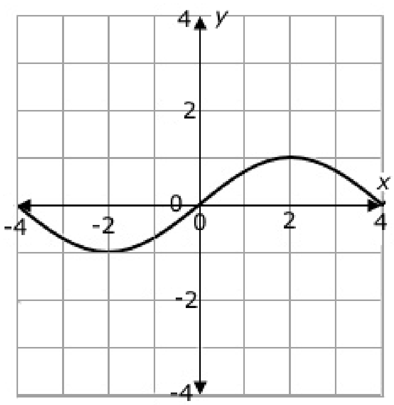
$f(x) = 4\sin(\pi x)$

Which of the following options correctly graphs the function of the radio station's radio signal?

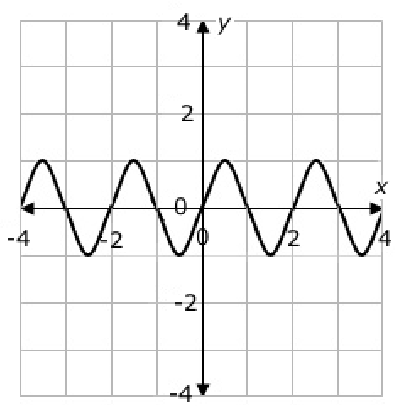
A



B



C



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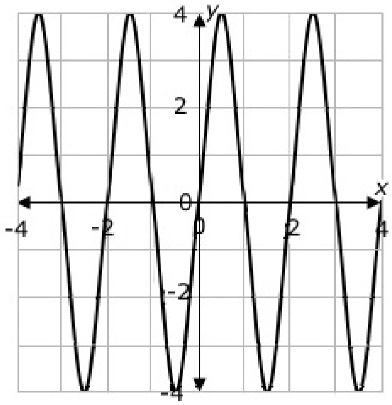
D 

40

An angle has a radian measure of $\frac{\pi}{12}$.

What is the approximate value of sin $\frac{\pi}{12}$?

Round to the nearest hundredth place.

41

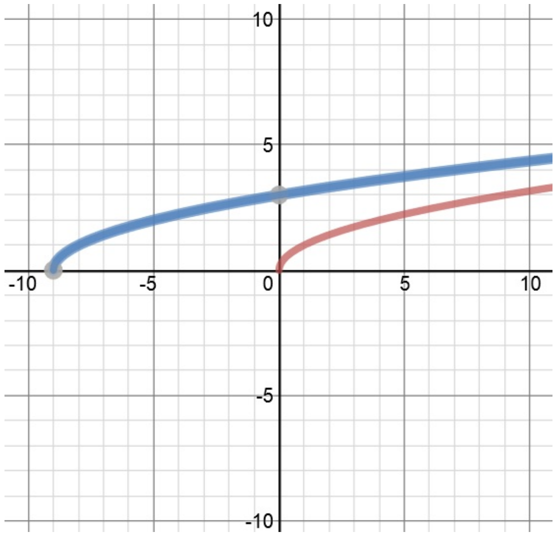
Karif claims that the inverse of the function $f(x) = 1 + \frac{1}{4}x$ can be found by taking the reciprocals of the constant and the coefficient. Omar claims that the inverse of the function is found using a different process.

Enter the inverse function $f^{-1}(x)$ to determine whether Karif or Omar is correct.

$f^{-1}(x)$ = ___________

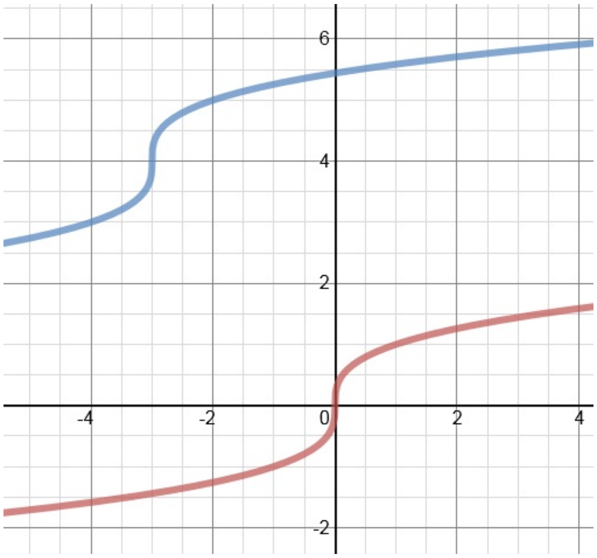
42

Describe the transformation going from the parent function (red) to the child (blue)



43

Describe the Transformation(s) you see going from the Parent (red) to the child (blue)

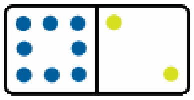


44

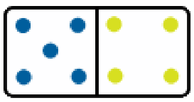
Luke wrote a problem that adds up to 9.

6 + 3 = 9

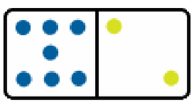
Which of the following problems also add up to 9? Pick TWO that are correct.

A 

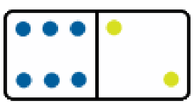
8 + 2 =

B 

5 + 4 =

C 

7 + 2 =

D 

6 + 2 =

45

Simplify.

$$\frac{x^2 - 9}{x^2 - x - 6}$$

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

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

C $\frac{x-3}{x+2}$

D $\frac{x+3}{x+2}$

46

Simplify:

$$\frac{25x^6y^6}{-5x^4y^7}$$

A $-\frac{5x^2}{y}$

B $-\frac{5x^{10}}{y^{13}}$

C $\frac{5x^2}{y}$

D $\frac{5x^{10}}{y^{13}}$

47

Which of the following functions uses DIFFERENT sets as its domain and range?

A $f(x) = \frac{1}{x}$

B $f(x) = \sqrt{x}$

C $f(x) = x$

D $f(x) = |x|$

48

What is the DOMAIN of $f(x) = \dfrac{x-2}{x+5}$?

A all real numbers except –5

B all real numbers except $-\dfrac{2}{5}$

C all real numbers except 1

D all real numbers except 2

49

What is the effect of the "–" when $y = (x + 3)^2$ is changed to $y = -(x + 3)^2$?

A The graph is reflected over the x–axis.

B The graph is reflected over the y–axis.

C The graph is reflected over the line $y = x$.

D The graph does not change.

50

What is $\sqrt{32}$ expressed in simpliest radical form?

A $16\sqrt{2}$

B $4\sqrt{2}$

C $4\sqrt{8}$

D $2\sqrt{8}$

E 6

51

John needs to rewrite the expression $(4x^3y^5z)^2$. Identify which of the following is the simplified form of the expression.

A $4x^5y^7z^3$

B $4x^6y^{10}z$

C $8x^5y^7z^3$

D $16x^6y^{10}z^2$

52

Which of the following equals $\frac{2}{3}$?

A $\sqrt{\frac{9}{25}}$

B $\sqrt{\frac{20}{45}}$

C $\sqrt{\frac{4}{27}}$

D $\sqrt{\frac{6}{9}}$

53

$$(12x^3y^4)(5x^6y^3)=$$

A $17x^9y^7$

B $17x^{18}y^{12}$

C $60x^9y^7$

D $60x^{18}y^{12}$

54

Simplify.

11^{-2}

A $\frac{1}{22}$

B $\frac{1}{121}$

C -22

D -121

55

Simplify.

$$\frac{1}{(-3)^{-2}}$$

A $-\frac{1}{6}$

B $\frac{1}{9}$

C 6

D 9

56

Evaluate the expression:

$3^{-2} \cdot 3^{2}$

A 3

B 1

C $\frac{1}{81}$

D –81

57

Let $p(x)$ be a polynomial with 4, $(x - 1)$, $(3 - x)$, and $(x^2 - 2)$ as four of its factors. Select *two* statements that are *true* for all such polynomials $p(x)$.

A The polynomial $p(x)$ must have 0 as a zero.

B The polynomial $p(x)$ must have 1 as a zero.

C The polynomial $p(x)$ must have 2 as a zero.

D The polynomial $p(x)$ must have 3 as a zero.

E The polynomial $p(x)$ must have 4 as a zero.

58

Let $f(x)$ and $g(x)$ be functions such that $f(x) = (x - 1)(x - 2)(x - 3)$ and $g(x) = k \cdot f(x)$ for some positive integer k. Select *two* statements that are true for all such functions $g(x)$.

A The function $g(x)$ has k as one of its zeros, since k is a factor of $g(x)$.

B The function $g(x)$ has exactly $3k$ zeros, since it has k times as many zeros as $f(x)$.

C The function $g(x)$ has exactly 3 zeros, since it has the same number of zeros as $f(x)$.

D The function $g(x)$ has 1, 2, and 3 as its zeros, since any zero of $f(x)$ is also a zero of $g(x)$.

E The function $g(x)$ has k, $2k$, and $3k$ as its zeros, since each zero of $g(x)$ is k times a zero of $f(x)$.

59

Serena claims that $(x + 3)$ is a factor of $p(x) = x^4 + 6x^3 + 12x^2 + 10x + 3$. Which equation must Serena show to be true in order to prove her claim?

A $p(0) = 3$

B $p(3) = 0$

C $p(0) = -3$

D $p(-3) = 0$

60

In order for $x - 2$ to be a factor of $x^3 - 6x^2 + 11x - 6$, the remainder of $(x^3 - 6x^2 + 11x - 6) \div (x - 2)$ must be equal to

________ .

1 -6

2 -2

3 0

4 2

61

Wyatt is asked to prove the polynomial identity $a^3 - b^3$. Which of the following expressions is the equivalent form of this identity?

A $(a + b)(a^2 - ab + b^2)$

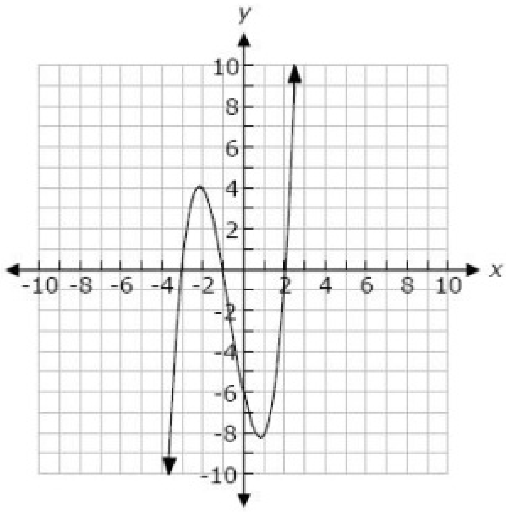
B $(a - b)(a^2 + ab + b^2)$

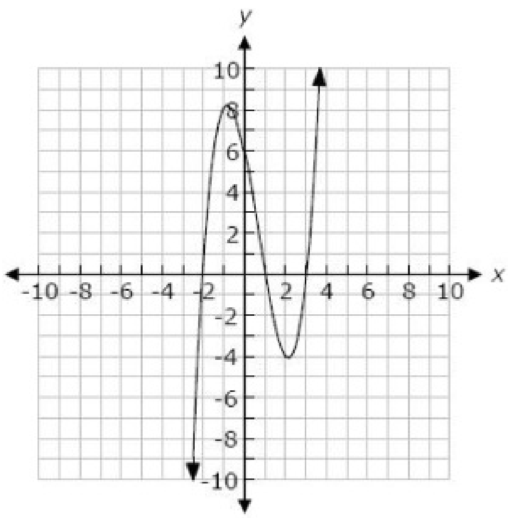
C $(a - b)(a^2 - ab + b^2)$

D $(a - b)(a^2 - ab - b^2)$

62

Identify the zeros of the factored polynomial $y = (x - 3)(x - 1)(x + 2)$ to determine which of the following graphs represents the function.

A


B


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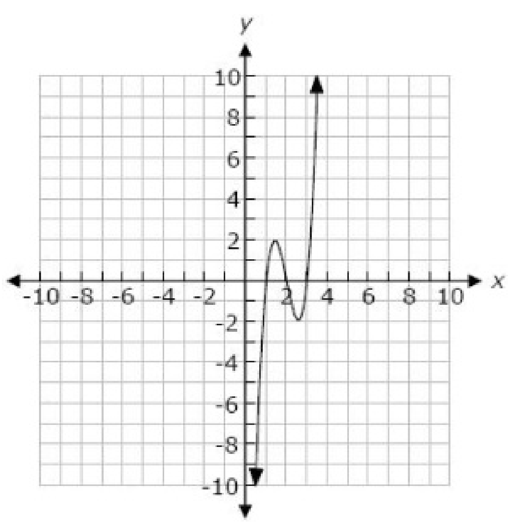
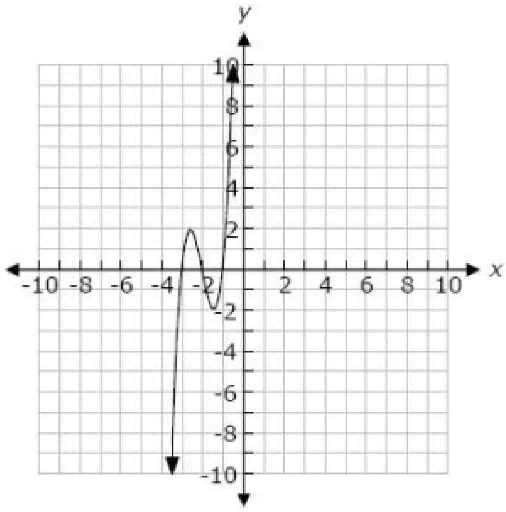
C


D 

63

Eric used the Remainder Theorem to find the remainder of $2x^3 - 4x^2 - 8x + 1$ divided by $x - 3$. If he calculated the remainder to be –5, what does that tell him?

A It tells Eric that $(2x^3 - 4x^2 - 8x + 1) \div (x - 3) = -5$

B It tells Eric that $x - 3$ is a factor of $2x^3 - 4x^2 - 8x + 1$.

C It tells Eric that $x - 3$ is not a factor of $2x^3 - 4x^2 - 8x + 1$.

D It tells Eric that he made a mistake in his calculations because the remainder should always be 0 when using the Remainder Theorem.

64

Find the remainder of $(3x^4 - 2x^3 + x^2 - 5x + 8) \div (x + 2)$ by using the Remainder Theorem.

A –18

B 4

C 34

D 86

65

Which fraction is equivalent to $\frac{x}{x + 1} + \frac{4}{x + 3}$?

A $\frac{2x + 4}{x^2 + 4x + 3}$

B $\frac{x^2 + 7x + 4}{x^2 + 4x + 3}$

C $\frac{x + 4}{2x + 4}$

D $\frac{x + 6}{x + 3}$

66

Which fraction is equivalent to $\frac{x^2 - 16}{x^2 - x - 12} \div \frac{4x - 20}{x^2 - x - 20}$?

A $\frac{4}{x + 3}$

B $\frac{4(x + 3)}{(x + 4)^2}$

C $\frac{(x + 4)^2}{4(x + 3)}$

D $\frac{(x - 4)(x + 4)}{4(x + 3)}$