Coordinate Algebra EOC (GSE) Quiz Answer Key

Functions - (MGSE9-12.F.IF.4) Interpret Features

Student Name: _____   Date: _____

Teacher Name: THUYNGA DAO   Score: _____

1)

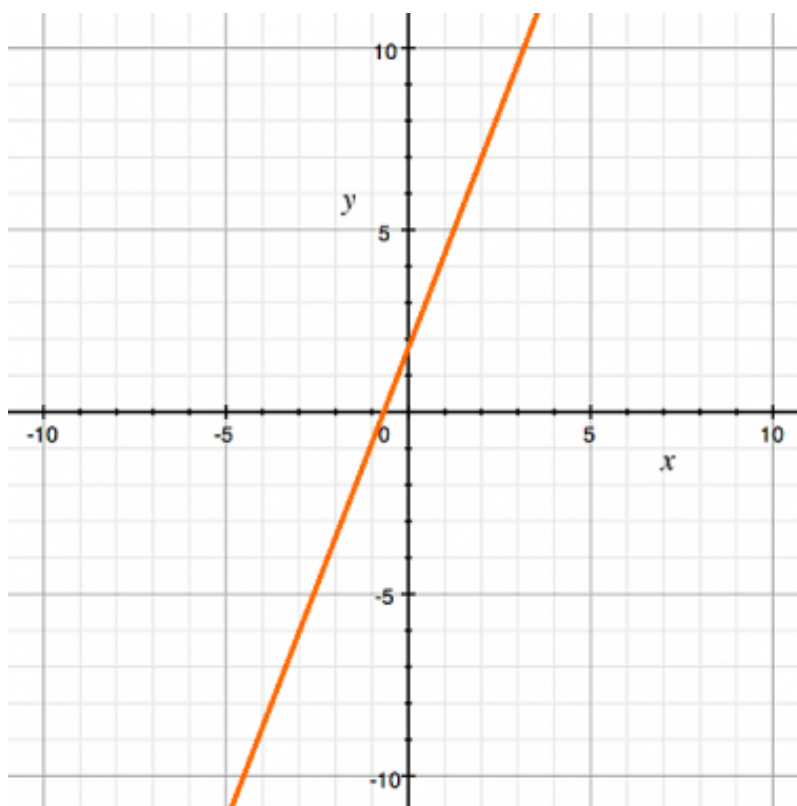| x	y
2	2
3	4
4	6
5	8

Which set of values in the RANGE corresponds to the set {2,4,5} in the DOMAIN?

    A)   {2,3,8}
    B)   {2,4,5}
    C)   {2,4,6}
    D)   **{2,6,8}**

Explanation:
The set of values in the range that correspond to {2,4,5} is **{2,6,8}**. Using the table, the y-value that corresponds with 2 is 2, the y-value that corresponds with 4 is 6, and the y-value that corresponds with 5 is 8.

2)

Which is the MOST reasonable estimate of the *y*-intercept for this linear graph?

    A)   -1.7

    B)   -0.6

    C)   0.6

    D)   1.7

Explanation:

From looking at the graph, you should see that the line crosses the *y*-axis at approximatly (0, 1.7). The *y*-intercept is **1.7**.

3)

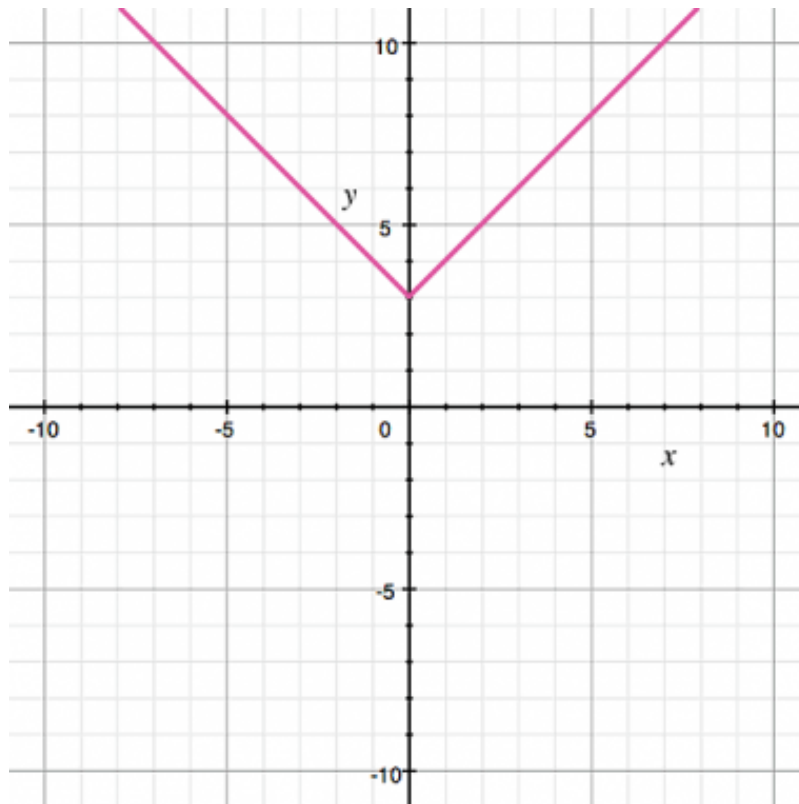$$\{(3,2), (-6,2), (7,3), (8,4)\}$$

What is the range of this function?

    A)   {2, 3, 4}

    B)   {7, 3, 8, 4}

    C)   {3, -6, 7, 8}

    D)   {3, 2, -6, 2}

Explanation:

The correct answer is **{2, 3, 4}**. The range values correspond to the y-values in the ordered pairs. The 2 should be only listed once in the solution set.
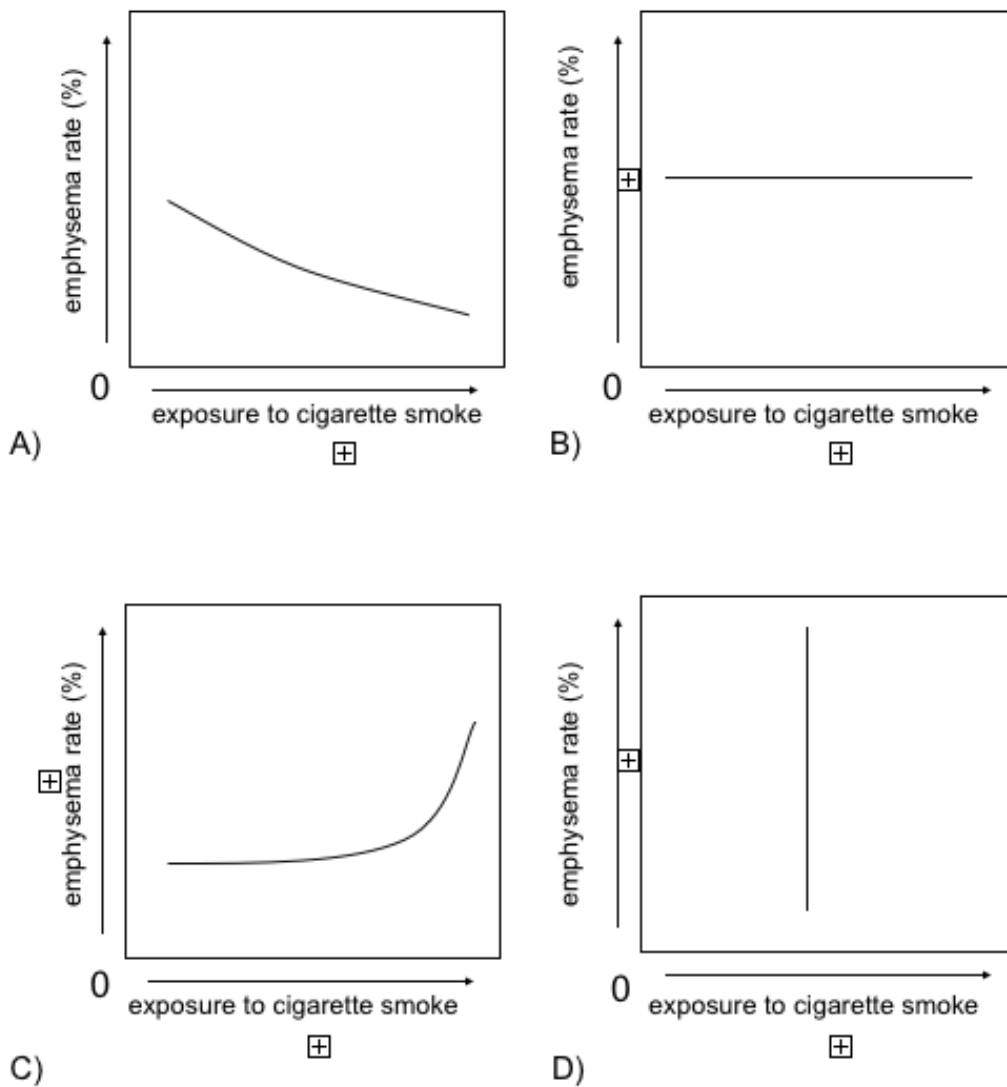
4)

The graph of the function y = | x | + 3 is shown. What is its range?

A)   y > 3
B)   y < 3
C)   y ≥ 3
D)   y ≤ 3

Explanation:

The correct answer is **y ≥ 3**. The range values correspond to the y coordinates of the graph. The vertex of the graph is (0,3) and opens up from there including all values greater than 3.

5)

A)

B)

C)

D)

Which graph indicates that increasing exposure to cigarette smoke increases the risk of emphysema? Justify your reasoning in terms of the behavior of the dependent and independent variables.

- A)   B: The dependent variable remains constant.
- B)   D; The independent variable remains constant.
- **C)   C; As the independent variable increases, the dependent variable increases.**
- D)   A; As the independent variable increases, the dependent variable decreases.

Explanation:
C; As the independent variable increases, the dependent variable increases.

The independent variable represents the exposure to cigarette smoke. The dependent variable represents the per cent rate of emphysema. As the exposure to cigarette smoke increases, so does the per cent rate of emphysema.

6)
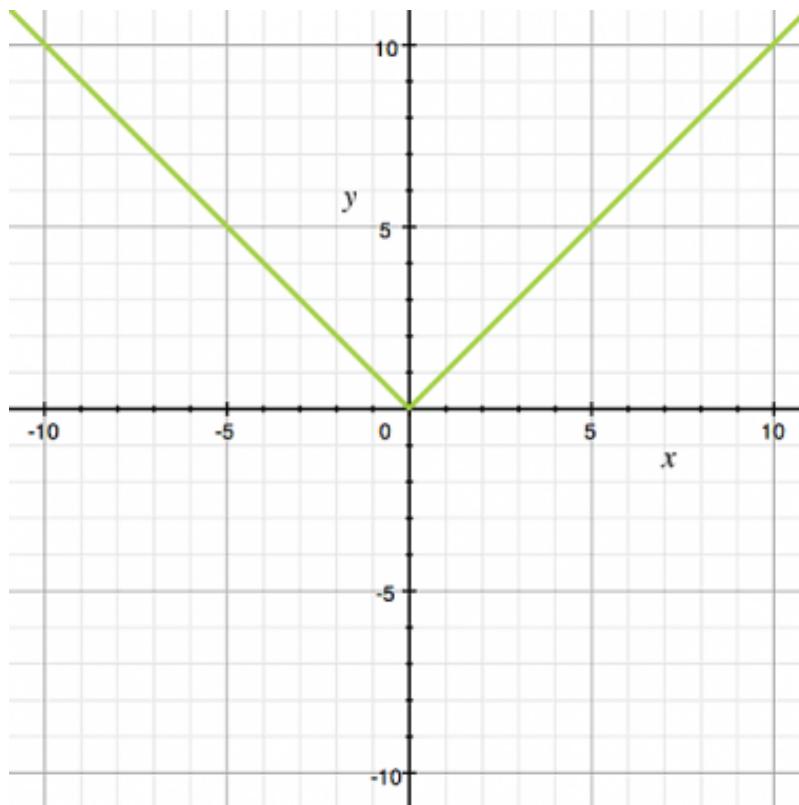
Which sentence best describes the function shown?

    A)   The function is odd.

    B)   The function is even.

    C)   The function is symmetric about the x-axis.

    D)   The function is symmetric about the origin.

Explanation:
The function is even. The function shown in the graph is $f(x) = |x|$. This function is symmetric about the y-axis and is therefore, even.

7)

Velocity

| t	V(t)
0	12
4	8.6
8	6.4
12	3.7
16	1.8
20	0.5

Jack decides to coast to a stop on his bicycle, so he quits pedaling. The table represents his velocity (in meters per second) as a function of time (in seconds). According to the table, which point is the y-intercept on a graph representing the data?

A)   (0, 0)
B)   (0, 12)
C)   (12, 0)
D)   (0, 20)

Explanation:
(0, 12)

The y-intercept is the value of V(t) when t = 0. According to the table, when t = 0, the value of V(t) is 12.

8)
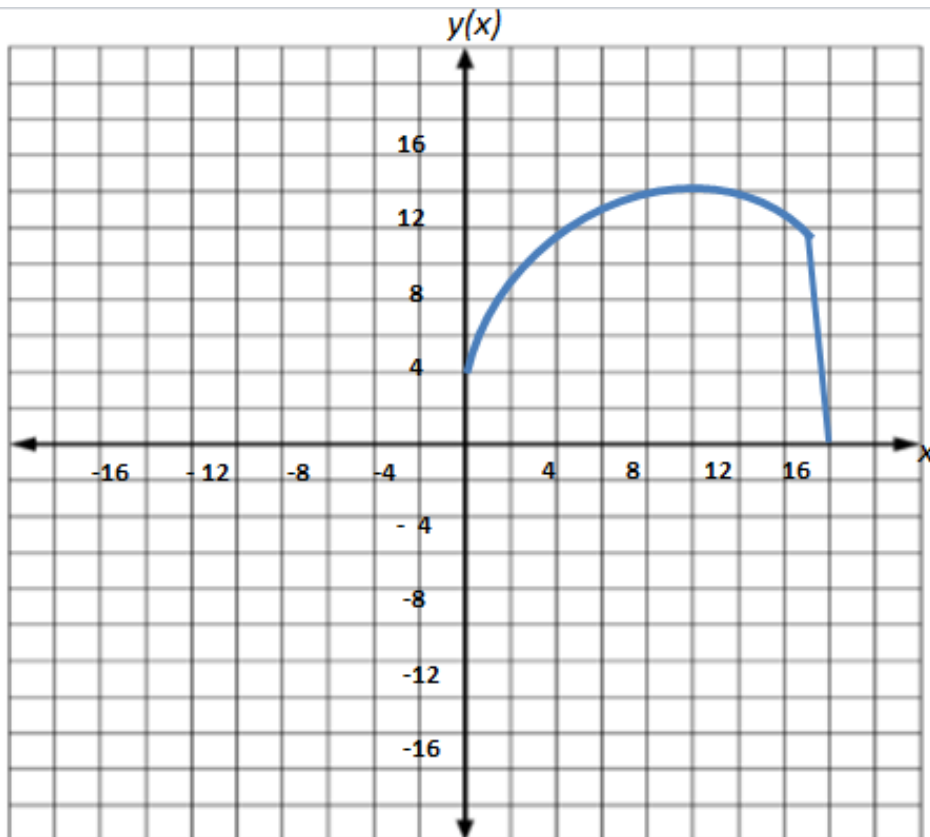
Joey, who is 8 years old, is a star player for his school's basketball team. His latest shot is shown on the graph, which represents the

height of the basketball as a function of the horizontal distance. The unit of measurement is feet. What is the significance of the point (0, 4) on the graph?

- A)   Joey caught the ball from a height of 4 feet.
- **B)   Joey released the ball from a height of 4 feet.**
- C)   Joey threw the ball a horizontal distance of 4 feet.
- D)   The lowest point of the ball on the graph is 4 feet.

Explanation:
Joey released the ball from a height of 4 feet.

The point (0,4) is the y-intercept. The y-intercept represents the initial height of the ball when Joey released it.
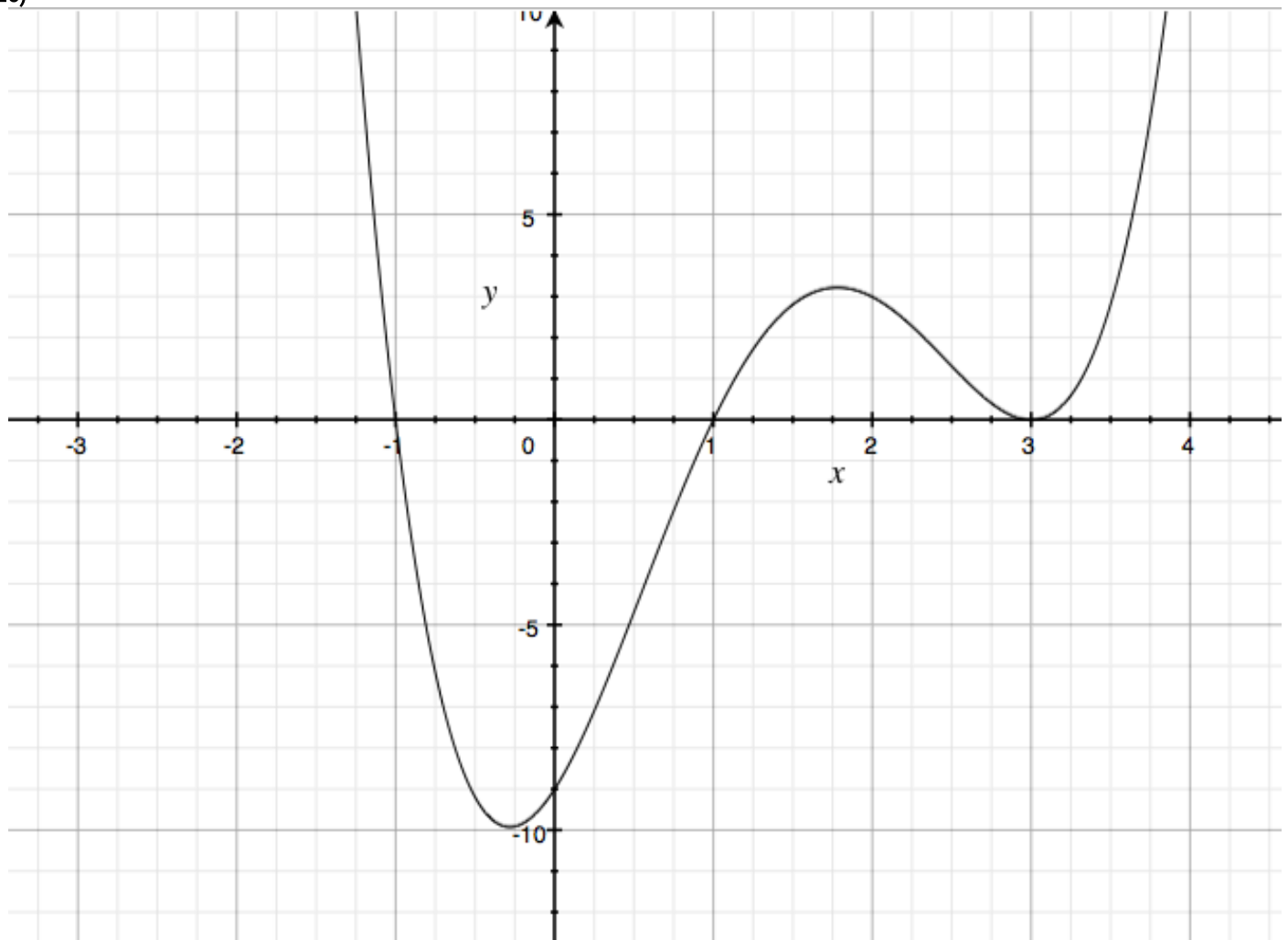
9) What is the range of f(x) = $-x^2$ + 4, if the domain is {2,0,1}?

- A)   {0,3,5}
- **B)   {0,4,3}**
- C)   {0,4,5}
- D)   {8,4,3}

Explanation:
The correct answer is **{0,4,3}**. The range for a function is found by substituting the domain values in for x and solving. When you put 2 in for x you get - 2^2 + 4 it equals 0. When you put 0 in for x you get - 0^2 + 4 it equals 4. When you put 1 in for x you get - 1^2 + 4 it equals 3.

10)

How can you tell the zeros of this function by looking at the graph? What are the zeros of the function?

  A)   Zeros occur at the minimum value. On this graph the zero is -10.
  B)   Zeros occur where the graph intercepts the y-axis. On this graph the only zero is -9.
  C)   Zeros occur where the graph intercepts the x-axis. On this graph the zeros are -1, 1, and 3.
  D)   Zeros occur where the graph intercepts the x-axis. On this graph the zeros are -1, 0, 1, and 3.

Explanation:
Zeros occur where the graph intercepts the x-axis. On this graph the zeros are -1, 1, and 3.

Zeros on the graph are the x-intercepts.

11) Rob is saving money for a down payment on a house. He opens a savings account at his local bank and deposits $1000. He models his savings plan with the equation y = 400x + 1000 based on his current income and monthly savings rate. What is the meaning of the y-intercept in the equation?

  A)   largest amount that he can save
  B)   date when he will have enough saved
  C)   date his savings account was started
  D)   starting amount in his savings account

Explanation:
The y-intercept represents the **starting amount in his savings account**.
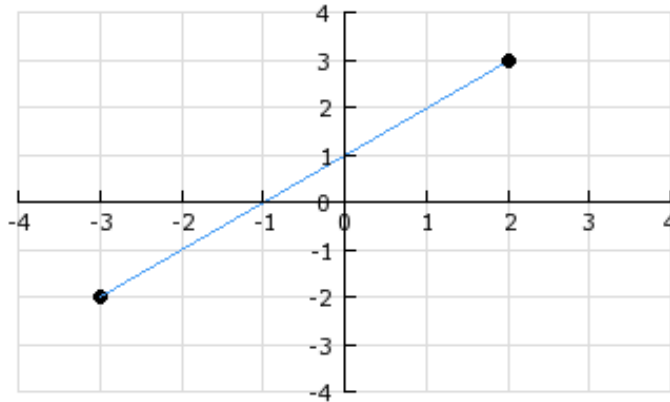
x = 0 for the y-intercept.
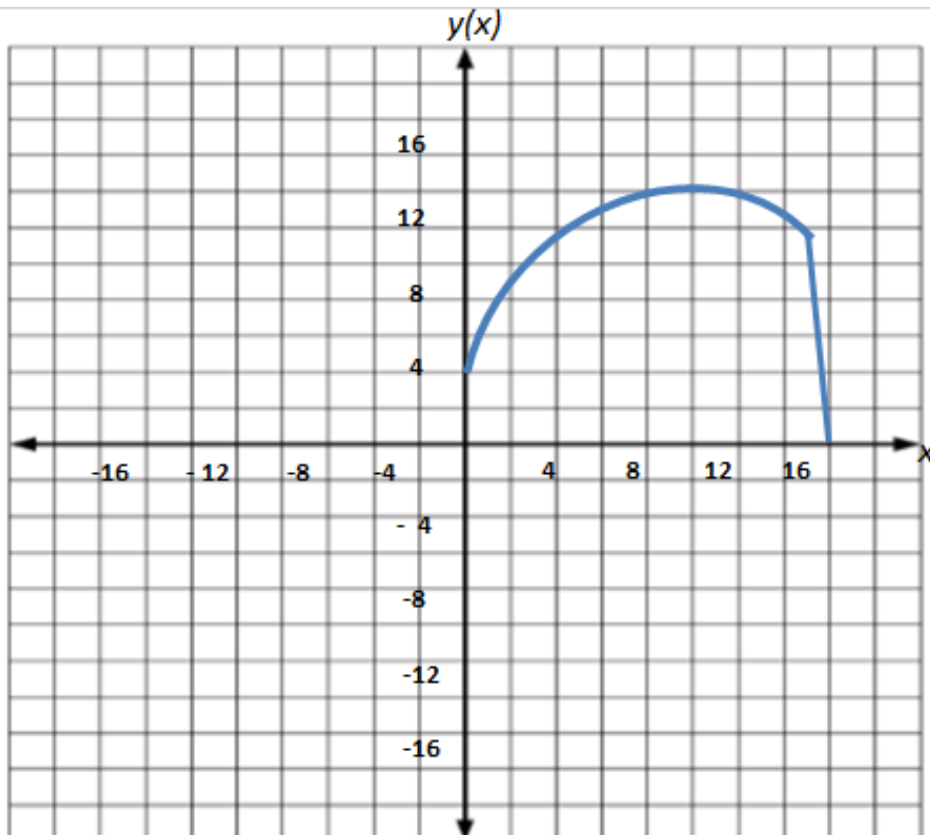
y = 400x + 1000
y = 400(0) + 1000

y = 1000

12)

What is the range for the graph shown?

A)   -3 ≤ y ≤ 2

B)   -3 and 2

C)   -3 ≤ y ≤ 3

D)   **-2 ≤ y ≤ 3**

Explanation:

The correct answer is **-2 ≤ y ≤ 3**. The range corresponds to the y coordinates of the graph. The y values for this graph are from -2 to 3, including all values between them.

13)

The graph represents the height of a basketball as a function of horizontal distance. The unit of measurement is feet. What is the best estimate for the interval where the function is decreasing?

    A)   When the basketball's horizontal distance was between 0 and 10 feet.

    B)   When the basketball's horizontal distance was between 5 and 11 feet.

    C)   When the basketball's horizontal distance was between 9 and 17 feet.

    D)   When the basketball's horizontal distance was between 11 and 17 feet.

Explanation:

When the basketball's horizontal distance is between 11 and 17 feet.

When the basketball is traveling downward, the function is decreasing. The ball begins its descent at a horizontal distance of about 11 feet. It reaches the ground at a horizontal distance of about 17 feet.

The function is decreasing **when the basketball's horizontal distance is between 11 and 17 feet.**

14) Steven works at a large home appliance store. He earns a base salary of $20,000 plus commission which can be modeled by the equation y = 0.1x + 20,000. What is the meaning of the y-intercept in the equation?

    A)   **Steven's base pay**

    B)   Steven's total sales

    C)   Stevens commission pay

    D)   highest pay Steven can earn

Explanation:

The y-intercept represents **Steven's base pay**.

x = 0 for the y-intercept.

y = 0.1x + 20,000
y = 0.1(0) + 20,000
y = 20,000

15) What is the end behavior of the graph of f(x) = −0.25x^2 − 2x + 1?

    A)   As x increases, f(x) increases.
            As x decreases, f(x) decreases.

    B)   **As x increases, f(x) decreases.**
            As x decreases, f(x) decreases.

    C)   As x increases, f(x) increases.
            As x decreases, f(x) increases.

    D)   As x increases, f(x) decreases.
            As x decreases, f(x) increases.

Explanation:

End behavior means what are the y-values doing as the x-values both increase and decrease without bound.

This is a parabola (degree 2) with a negative leading coefficient (−0.25). Therefore both ends of the graph will be going towards negative infinity.

As x increases, f(x) decreases.
As x decreases, f(x) decreases.

16)

Velocity

t	V(t)
0	12
4	8.6
8	6.4
12	3.7
16	1.8
20	0.5

Jack decides to coast to a stop on his bicycle, so he quits pedaling. The table represents his velocity (in meters per second) as a function of time (in seconds). Which statement best describes the significance of V(t) having a value of zero?

A)　　Jack has coasted for 20 seconds.
B)　　Jack's bicycle will not be moving.
C)　　Jack is pedaling his bicycle again.
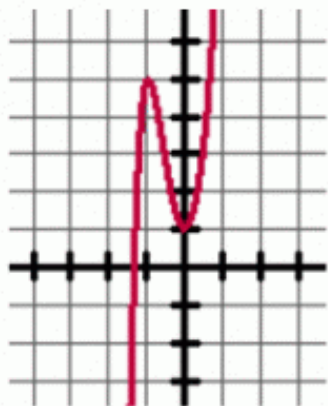D)　　Jack has traveled at least 200 meters.

Explanation:
Jack's bicycle will not be moving.

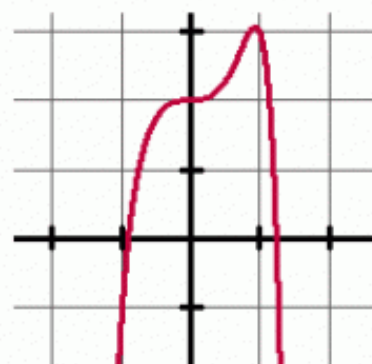When V(t) = 0 there is no velocity, meaning the bicycle has stopped moving.

17)

Several polynomial functions are graphed. Which graph displays a polynomial function with all even exponents?
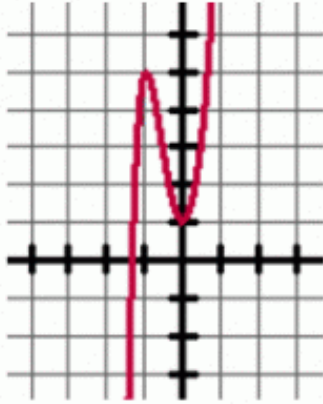
A)

B)

C)

D)

Explanation:

The correct answer is **C**. A polynomial function with even exponents will have y-axis symmetry.

18)
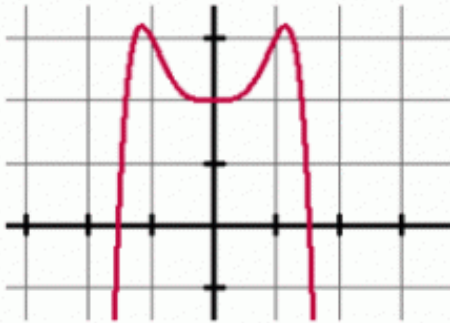
A.
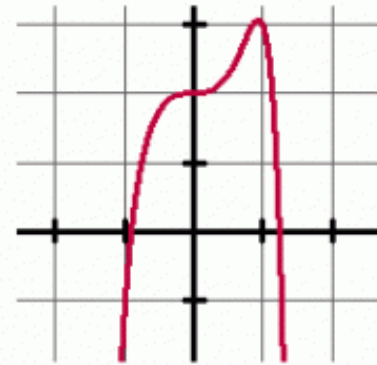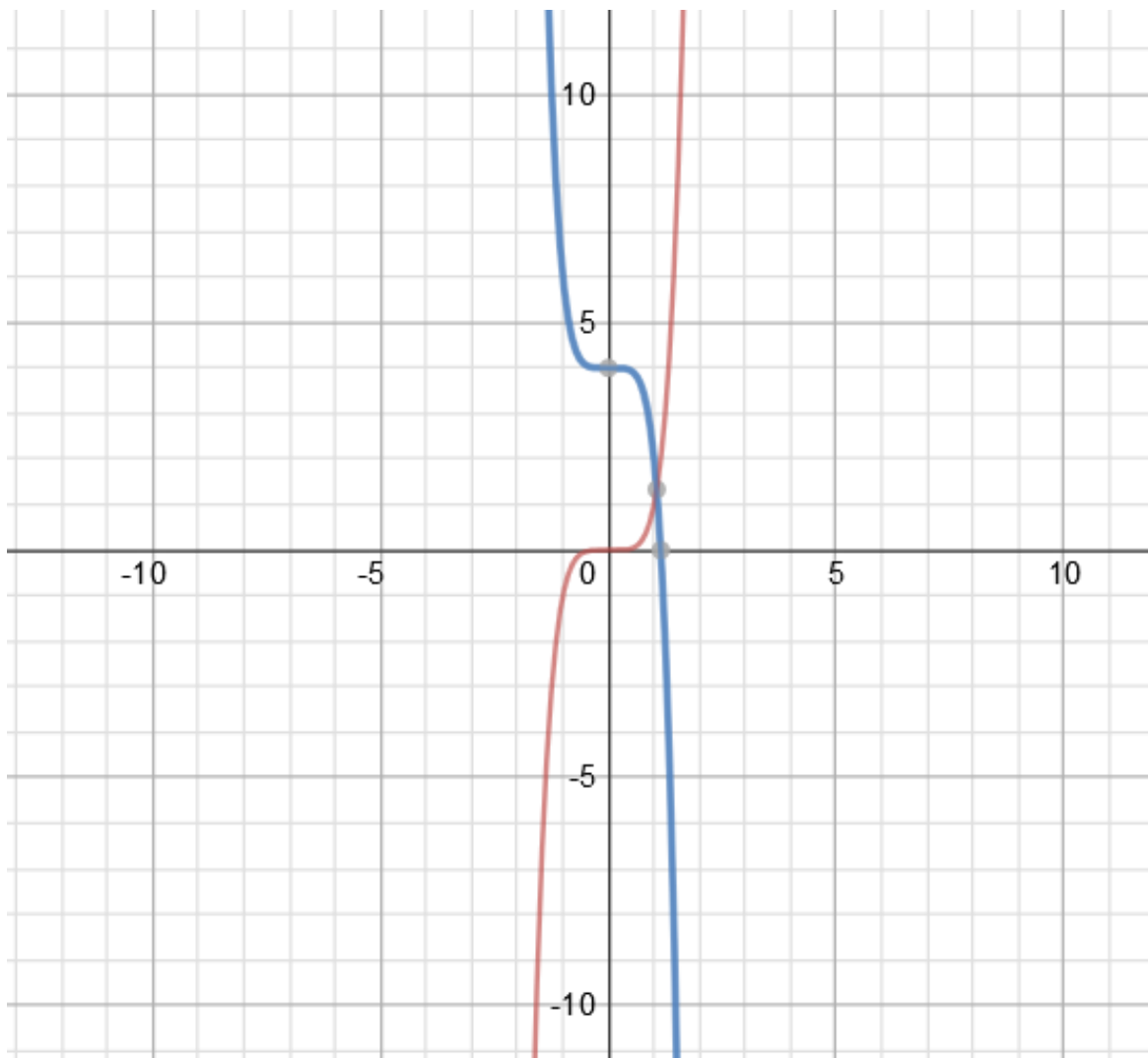
B.

C.

D.

Several power functions are graphed. Which graph displays a power function with only odd exponents?

A)

B)

C)

D)

Explanation:

The correct answer is **B**. A power function with odd exponents will have origin symmetry.

19)

The red graph represents $P(x) = x^5$. Which polynomial function could represent the transformed curve shown in blue?

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

Explanation:
$P(x) = -2x^5 + 4$

The graph reflects and is shifted upward 4 units.

20) Consider $P(x) = x^4(x - 2)^3(x + 1)^2$. What are the zeros of the function? What is the multiplicity of each zero?
- A)   0, multiplicity of 4; 2, multiplicity of 3; −1, multiplicity of 2
- B)   0, multiplicity of 4; −2, multiplicity of 3; 1, multiplicity of 2
- C)   0, multiplicity of 4; −2, multiplicity of 3
- D)   2, multiplicity of 3; −1, multiplicity of 2

Explanation:
0, multiplicity of 4; 2, multiplicity of 3; −1, multiplicity of 2

To find the zeros:
Set each factor equal to zero and solve for x. The zeros are 0, 2, and −1.

The exponent for each factor tells the multiplicity of the zero.

x^4, 0 has a multiplicity of 4
$(x - 2)^3$, 2 has a multiplicity of 3
$(x + 1)^2$, −1 has a multiplicity of 2

21) Consider $P(x) = x^4(x - 2)^3(x + 1)^2$. For each zero, determine if the graph crosses the x-axis. How do you know?

A) The behavior of the graph at 0 cannot be determined. The graph crosses the x-axis at −1 and 2 because the degree of the polynomial is even.

B) The zeros at 0 and −1 do not cross the x-axis because they have even multiplicity. The zero at 2 crosses the x-axis because it has odd multiplicity.

C) The zeros at 0 and −1 cross the x-axis because they have even multiplicity. The zero at 2 does not cross the x-axis because it has odd multiplicity.

D) The zeros at 0 and −1 do not cross the x-axis because they have odd multiplicity. The zero at 2 crosses the x-axis because it has even multiplicity.

Explanation:
The zeros at 0 and −1 do not cross the x-axis because they has even multiplicity. The zero at 2 crosses the x-axis because it has odd multiplicity.

The multiplicity of the zero determines whether the graph crosses the x-axis at that zero. If the multiplicity is even, the graph does not cross. If the multiplicity is odd, the graph crosses.

22) Aster sells used cars. She earns no base pay, but is paid a commission of 25% for each car sold which can be modeled by the equation y = 0.25x, where x represents the total dollar amount of car sales. What is the meaning of the x-intercept in the equation?

    A)   Aster's percentage of the sales

    B)   amount of earned raised with no sales

    C)   Used car company's percentage of sales

    D)   amount of sales when no money has been earned

Explanation:

The x-intercept represents **amount of sales when no money has been earned**.

y = 0 for the x-intercept

y = 0.25x
0 = 0.25x
x = 0

23) Determine the end behavior of P(x) = -3x^4 + 5x^3 + 4x - 7.

    A)   y →∞ as x →∞ and y →-∞ as x →∞

    B)   y →∞ as x →-∞ and y →-∞ as x →∞

    C)   y →-∞ as x →-∞ and y →∞ as x →∞

    D)   y →-∞ as x →-∞ and y →-∞ as x →∞

Explanation:
y →-∞ as x →-∞ and y →-∞ as x →∞

The end behavior is determined by the degree of the polynomial and the leading coefficient. The degree of the given polynomial is 4 and the leading coefficient is -3. Since the polynomial has an even degree and a negative leading coefficient, the end behavior can be described as "down, down." Therefore, y always approaches negative infinity.

24)

Which statement about the graph is FALSE?

    A)   The graph has one local extrema

    B)   The graph has no local maximum.

C)   **The graph has two local extrema.**

D)   The graph has one local minimum.

Explanation:
The graph has two local extrema.

The graph has one local minimum at (3, -3). There are no local maximums. Therefore, the total number of local extrema is 1.

25) Molly graphed the function f(x) = (x - 1)^2 (x + 2)^3. Molly's graph shows that as x → −∞, y → −∞ and as x → ∞, y → ∞. Is Molly's graph correct? Justify your answer.

A)   It cannot be determined without looking at the graph.

B)   Molly is correct because the function has a sum and a difference as factors.

C)   Molly is incorrect because the function has an even degree and an odd degree as factors.

D)   **Molly is correct because the function represents an odd degree with a positive leading coefficient.**

Explanation:
Molly is correct because the function represents an odd degree with a positive leading coefficient.

The product of (x - 1)^2 (x + 2)^3 will have a positive x^5 as the highest degree. Since the leading coefficient is positive and the power of x is odd, the graph will be downward to the left and upward to the right. So, as x approaches negative infinity, so does y. Likewise, as x approaches positive infinity, so does y.

Molly is correct because the function represents an odd degree with a positive leading coefficient.