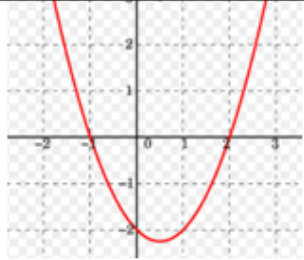
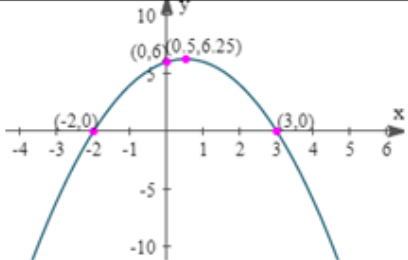


Math 30-2 Polynomial Functions Lesson 2 Practice Questions [Solutions at the end]

Use the following information to answer the next question.

1. For the given graphs, write its equation in factored form, determine the x-intercepts, state if 'a' is positive or negative and state the value of 'c', in the form $f(x) = ax^2 + bx + c$

Graph		Graph	
x-intercepts			
Factored form			
Sign of 'a'			
Value of 'c'			

2. The graph of a cubic function of the form $y = ax^3 + bx^2 + cx + d$, where $a > 0$ and $d > 0$, extends from quadrant i to quadrant ii and the sign of the y-intercept is iii.

Which row below completes this statement?

Row	i	ii	iii
A	2	4	Negative
B	2	4	Positive
C	3	1	Negative
D	3	1	Positive

Use the following information to answer the next question.

The following statements were made about the polynomial function $y = (x - 6)^2(x + 2)$

Statement 1	The function has a degree of 2.
Statement 2	The domain is $-2 \leq x \leq 6, x \in \mathbb{R}$.
Statement 3	The x-intercepts are -2 and 6.
Statement 4	The range is $y \in \mathbb{R}$.

3. The true statements are

A) 1,3,4

B) 2,3,4

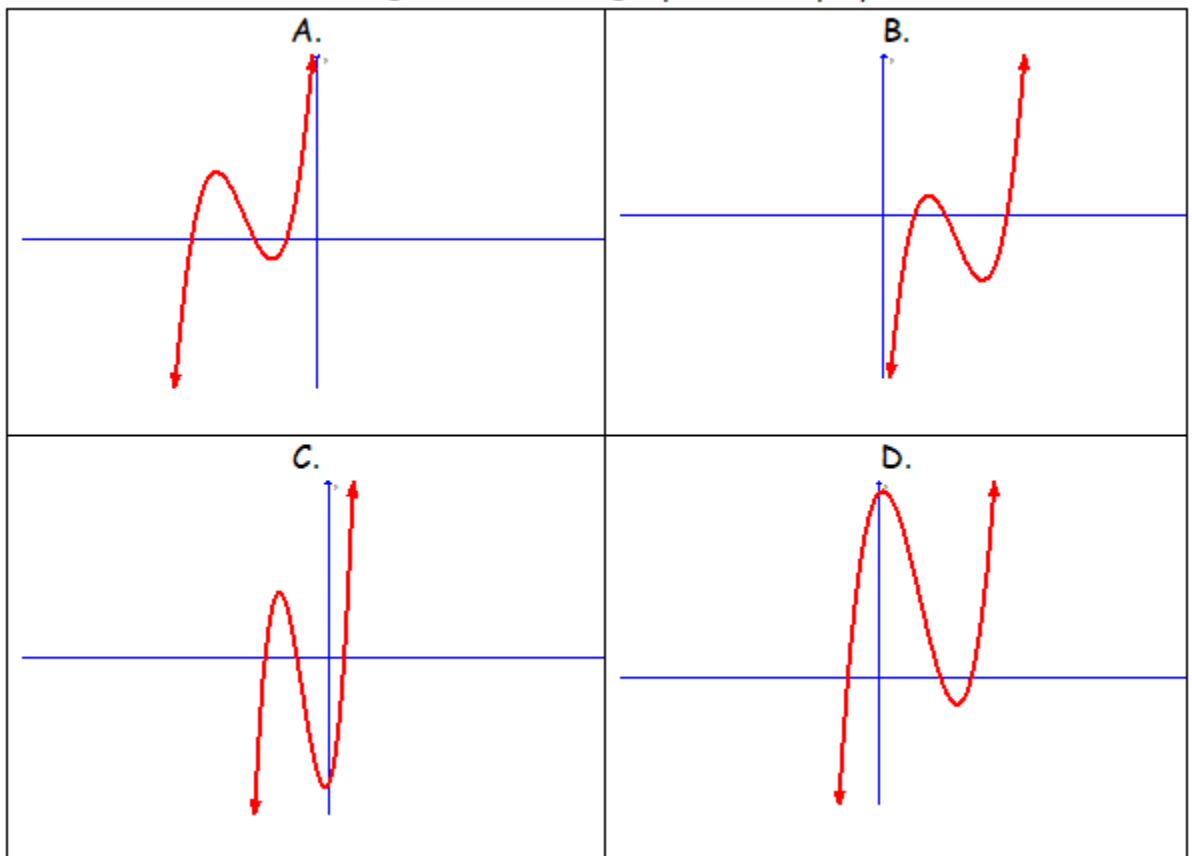
C) 1 and 3 only

D) 3 and 4 only

Use the following information to answer the next question.

An equation of a particular cubic function is $y = (x - k)(x - m)(x - n)$, where $k, m,$ and n are different whole numbers.

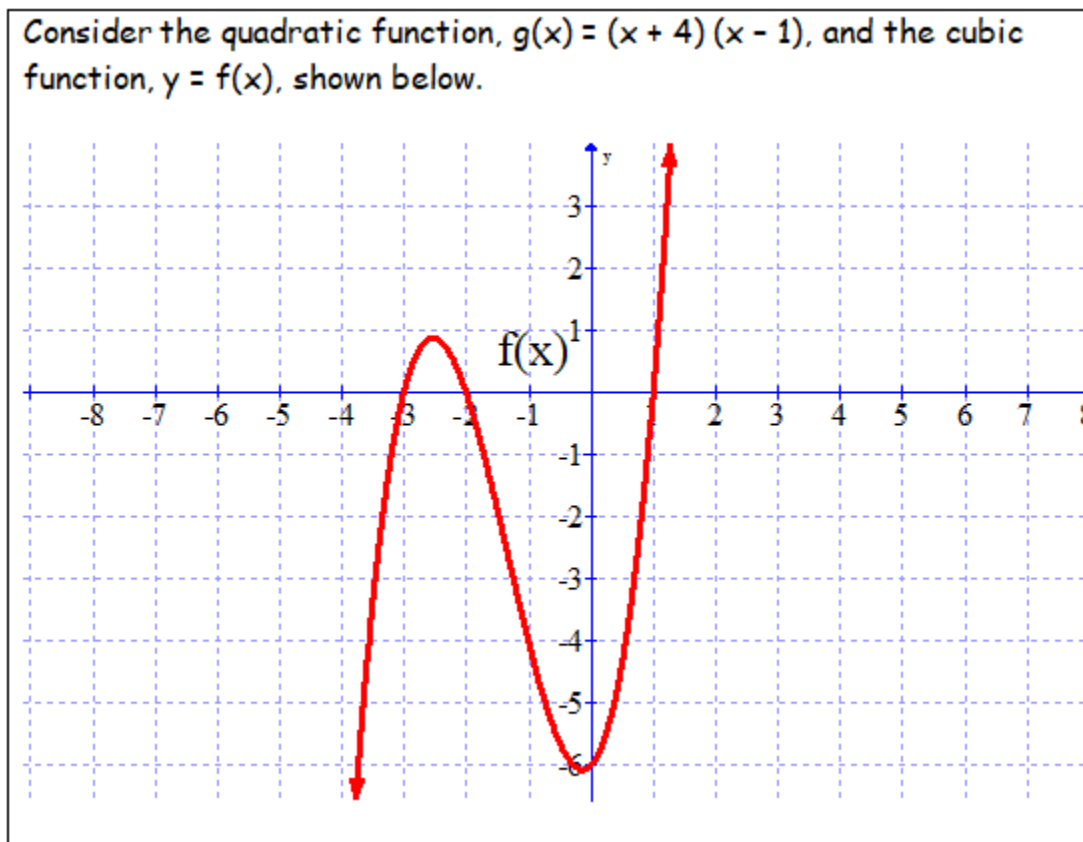
4. Which of the following could be the graph of this polynomial function?



5. Given $f(x) = -(x + 4)(x + 1)(x - 2)^2$, which statement below is false, in terms of describing its graph?

- a) There are 3 turning points.
- b) One of the x-intercepts is -1.
- c) The range is $\{y \mid y \geq 50.19\}$.
- d) The y-intercept is -16.

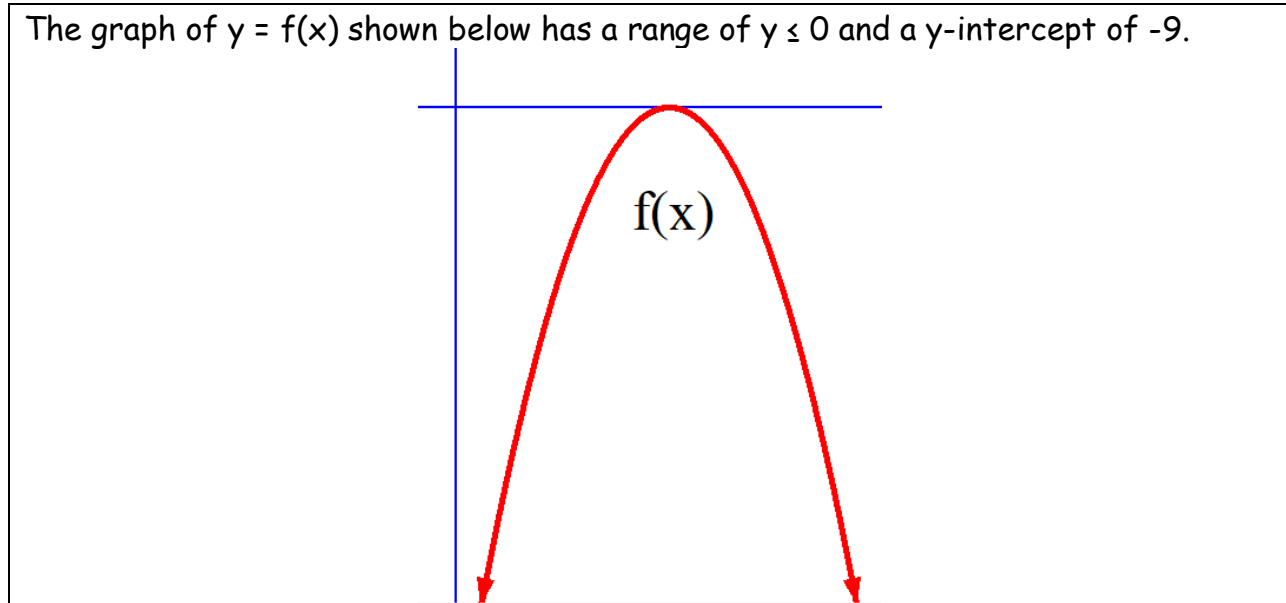
Use the following information to answer the next question.



6. The x-intercept common to $f(x)$ and $g(x)$ is _____.

Use the following information to answer the next question.

The graph of $y = f(x)$ shown below has a range of $y \leq 0$ and a y -intercept of -9 .

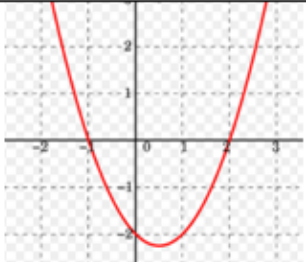
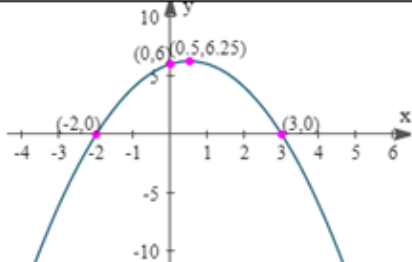


7. A possible equation, in factored form, for this graph could be
A) $y = (x + 3)^2$ B) $y = -(x + 3)^2$ C) $y = (x - 3)^2$ D) $y = -(x - 3)^2$
8. Describe the graph of $y = -(x + 3)^2(x - 5)$. Include end behaviour, turning points given as specific coordinates, intercepts, domain and range.

Math 30-2 Polynomial Functions Lesson 2 Teaching Handout Solutions

Use the following information to answer the next question.

1. For the given graphs, write its equation in factored form, determine the x-intercepts, state if 'a' is positive or negative and state the value of 'c', in the form $f(x) = ax^2 + bx + c$

Graph		Graph	
x-intercepts	$x = -1$ and 2		$x = -2$ and 3
Factored form	$f(x) = a(x + 1)(x - 2)$		$f(x) = a(x + 2)(x - 3)$
Sign of 'a'	positive		negative
Value of 'c'	$c = -2$		$c = 6$

2. The graph of a cubic function of the form $y = ax^3 + bx^2 + cx + d$, where $a > 0$ and $d > 0$, extends from quadrant i to quadrant ii and the sign of the y-intercept is iii.

Which row below completes this statement?

Row	i	ii	iii
A	2	4	Negative
B	2	4	Positive
C	3	1	Negative
D	3	1	Positive

Solution

The leading coefficient is represented by the letter a . Since $a > 0$, the end behavior, moving from left to right on the coordinate grid, is extending from quadrant 3 to quadrant 1.

The y-intercept is represented by the letter d . Since $d > 0$, the sign of the y-intercept is positive.

Row D correctly completes the statement.

Use the following information to answer the next question.

The following statements were made about the polynomial function $y = (x - 6)^2(x + 2)$

Statement 1	The function has a degree of 2.
Statement 2	The domain is $-2 \leq x \leq 6, x \in \mathbb{R}$.
Statement 3	The x-intercepts are -2 and 6.
Statement 4	The range is $y \in \mathbb{R}$.

3. The true statements are

A) 1,3,4

B) 2,3,4

C) 1 and 3 only

D) 3 and 4 only

Solution

Statement 1 is false. The function has a degree of 3. If the function was expanded, the exponent on the variable x would be 3.

Statement 2 is false. The domain is the set of real numbers.

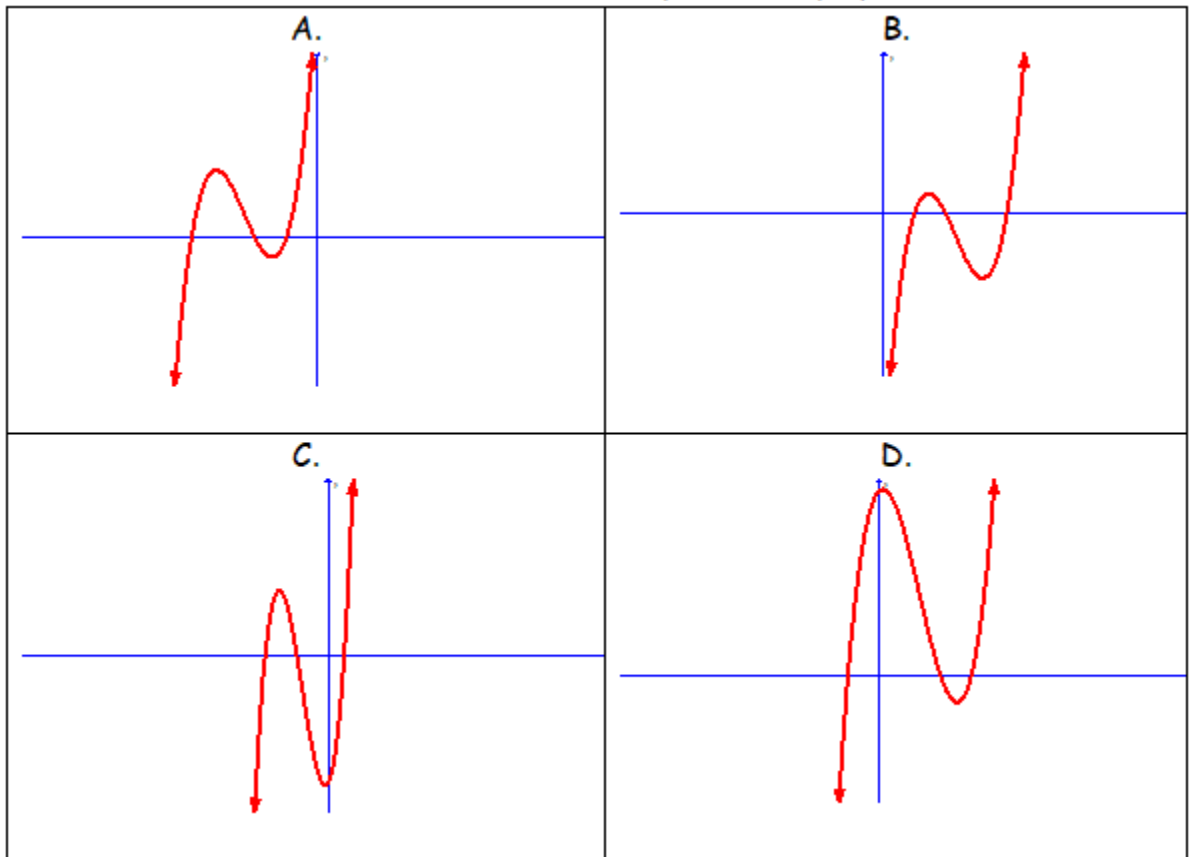
Statement 3 is true.

Statement 4 is true.

Use the following information to answer the next question.

An equation of a particular cubic function is $y = (x - k)(x - m)(x - n)$, where k , m , and n are different whole numbers.

4. Which of the following could be the graph of this polynomial function?



Solution

All of the binomials in this cubic function have a subtraction sign. This indicates that all of the zeros are to the right of the origin.

The only graph displaying all of the zeros to the right of the origin is B.

The correct answer is B.

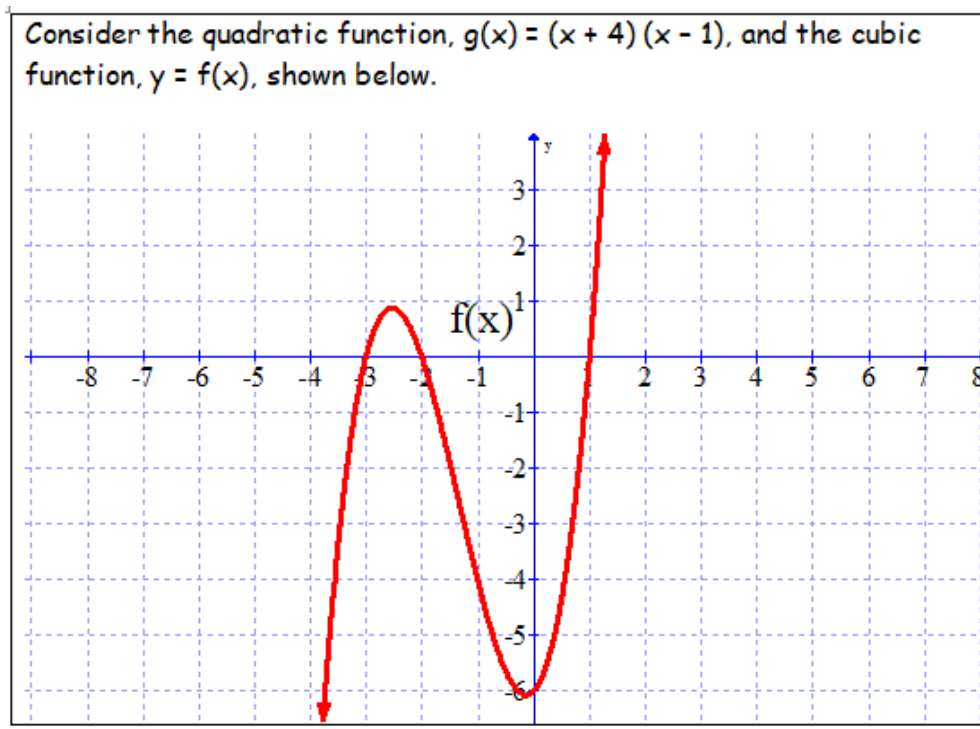
5. Given $f(x) = -(x + 4)(x + 1)(x - 2)^2$, which statement below is false, in terms of describing its graph?

- a) There are 3 turning points.
- b) One of the x-intercepts is -1.
- c) The range is $\{y \mid y \geq 50.19\}$.
- d) The y-intercept is -16.

Solution

The range is $\{y \mid y \leq 50.19\}$. The inequality symbol is not correct. The range is any real number less than 50.19.

Use the following information to answer the next question.



6. The x-intercept common to $f(x)$ and $g(x)$ is 1.

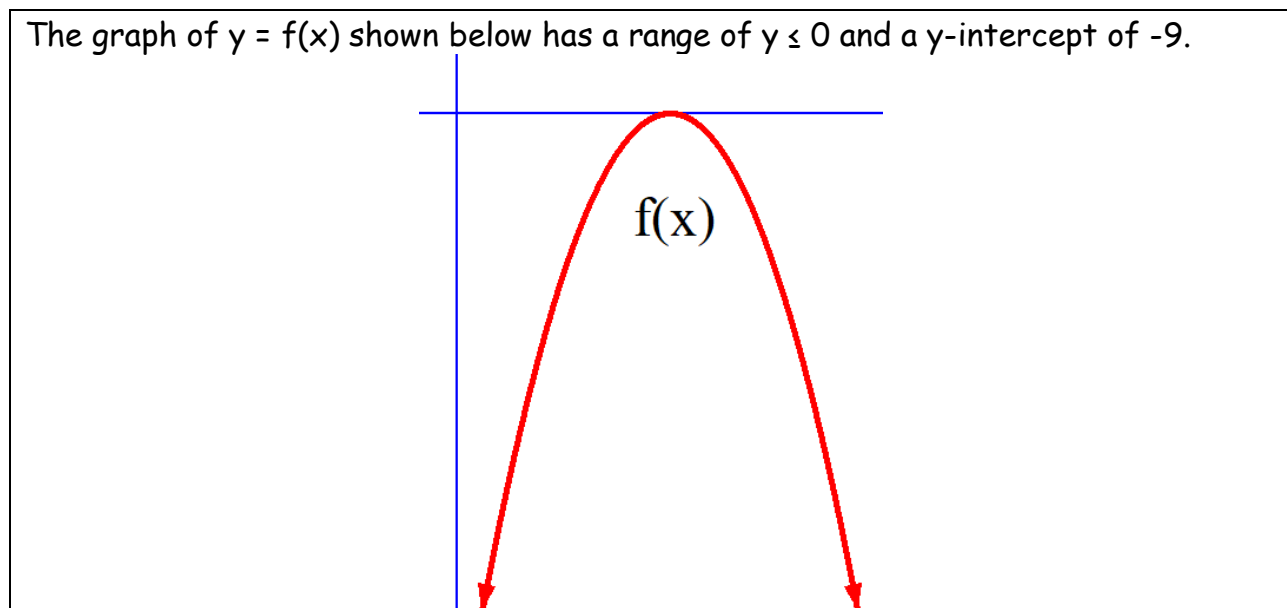
Solution

From the graph of $f(x)$, we can see that the x -intercepts are -3 , -2 , and 1 .

From the equation of $g(x)$, we can determine that the x -intercepts are -4 and 1 .

The common x -intercept is 1 .

Use the following information to answer the next question.



7. A possible equation, in factored form, for this graph could be

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

Solution

Since the parabola opens down, the leading coefficient is negative. Options B and D both show a negative coefficient.

Since the y -intercept is -9 , substituting the point $(0, -9)$ into the correct equation should show that the left side of the equal sign is equal to the right side.

Substitute $(0, -9)$ into $y = -(x - 3)^2$.

$$(-9) = -((0) - 3)^2$$

$$-9 = -(-9)^2$$

$$-9 = -9$$

Of the equations given, this is the only equation that will be satisfied with the point (0, -9).

The correct answer is D.

8. Describe the graph of $y = -(x + 3)^2 (x - 5)$. Include end behaviour, turning points given as specific coordinates, intercepts, domain and range.

Solution

The graph is a cubic function; in other words, an odd degree polynomial. Since the leading coefficient is negative, the graph extends up in quadrant one and down in quadrant 4.

There are two turning points. Viewed on a graphing calculator, there is a local minimum at (-3, 0) and a local maximum at (2.33, 75.85).

To determine the y-intercept, set $x = 0$ and solve for y .

$$y = -((0) + 3)^2 ((0) - 5)$$

$$y = -(9) (-5)$$

$$y = 45$$

The y-intercept is 45.

The x-intercepts are -3 and 5.

The domain and range are both elements of the real numbers.