# Unit 3 Test Prep

1. What is the factored form for this equation. $y = 6x^2 + 19x - 7$

$a \cdot c = \#$

$6 \cdot (-7) = -42$

| | |
|---|---|
| -2 | 21 |
| 1 | 42 |
| 6 | 7 |

$= 19$

| | 2x | 7 |
|---|---|---|
| 3x | $6x^2$ | 21x |
| -1 | -2x | -7 |

$y = (2x+7)(3x-1)$

| | 2x | +7 |
|---|---|---|
| 3x | $6x^2$ | 21x |
| -1 | -2x | -7 |

2. What is the general form for the equation $f(x) = -5(x+2)^2 - 4$ ← standard

$ax^2 + bx + c$

$= -5(x^2 + 4x + 4) - 4$

$= -5x^2 - 20x - 20 - 4$

| | x | 2 |
|---|---|---|
| x | $x^2$ | 2x |
| 2 | 2x | 4 |

f(x) = $-5x^2 - 20x - 24$

3. Complete the square to write the quadratic function in standard form. $y = a(x-h)^2 + k$

| | x | -3 |
|---|---|---|
| x | $x^2$ | -3x |
| -3 | -3x | 9 |

$f(x) = (5x^2 - 30x) + 6$

$5(x^2 - 6x + 9) + 6 - 9 \cdot 5$

$5(x-3) + 6 - 45$

f(x) = $5(x-3)^2 - 39$

4. Complete the square to write the quadratic in standard form

$\left(\frac{-b}{2a}\right)^2$

$f(x) = (x^2 + 8x) + 12$

$\left(\frac{-8}{2(1)}\right)^2 = \left(\frac{-8}{2}\right)^2 = (-4)^2$

16

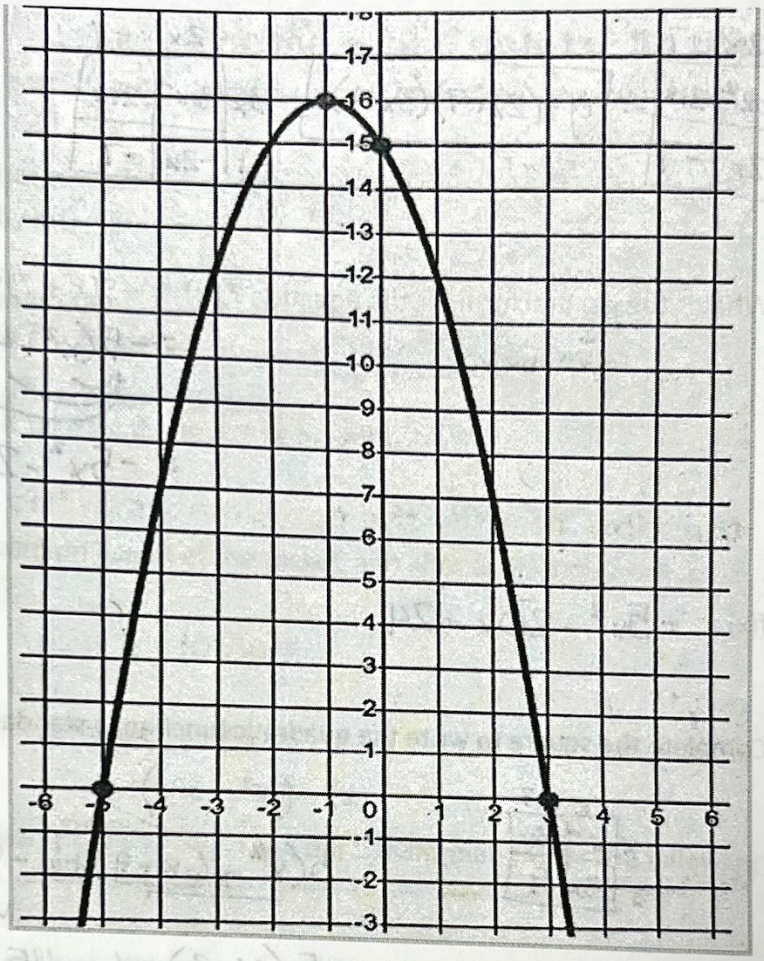
$(x^2 + 8x + 16) + 12 - 16$

$(x+4)^2 - 4$

| | x | 4 |
|---|---|---|
| x | $x^2$ | 4 |
| 4 | 4 | 16 |

f(x) =

5. Use the graph to answer the following questions.



Neg: ∩

Is the leading coefficient (a) a positive or negative?

Positive (Negative)

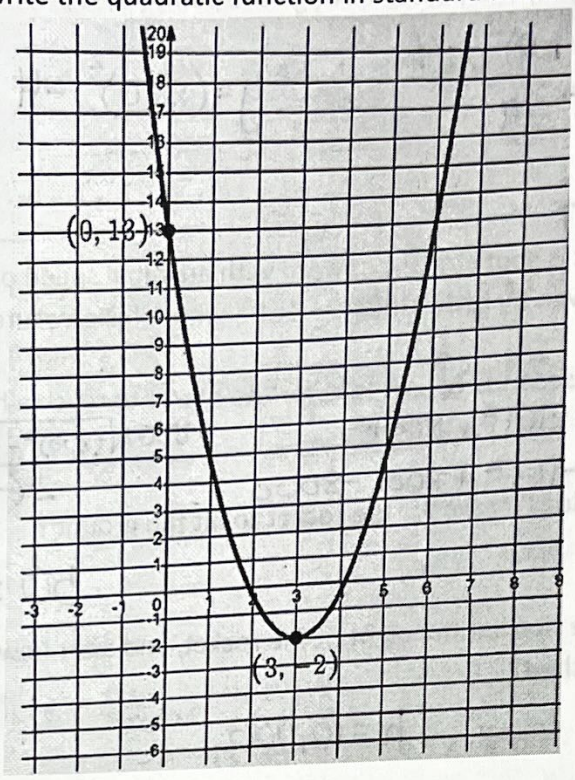
Vertex: (-1, 16)

Axis of Symmetry: x = -1

Coordinates of the x-intercept(s): (-5, 0), (3, 0)

Coordinates of the y-intercept(s): (0, 15)

6. Use the graph to write the quadratic function in standard form.




$a(x-h)^2 + k$

$a(x-3)^2 - 2$

$13 = a(0-3)^2 - 2$

$13 = a(9) - 2$

$+2 \qquad +2$

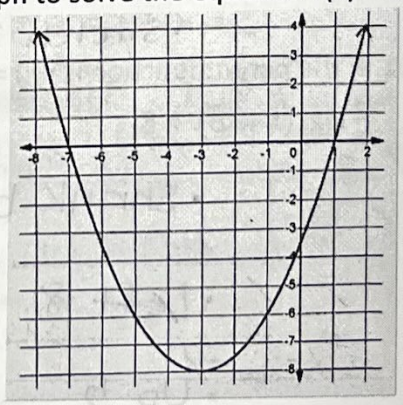
$\frac{15}{9} = \frac{9a}{9}$

$\frac{15}{9} = a$

$\frac{5}{3} = a$

$f(x) = \frac{5}{3}(x-3)^2 - 2$

7. The graph of the function f(x) is shown. Use the graph to solve the equation f(x) = 0.



A) X = -3, X = 8

B) X = 0

C) X = 0, X = -4

D) X = -7, X = 1

E) X = -8, X = 2

$y = a(x-h)^2 + k$

8. The vertex is (0, -4) and passes through the point (-1, -3). What is the formula?

$-3 = a(-1+0)^2 - 4$

$-3 = a(-1)^2 - 4$

$-3 = a - 4$

$+4 \quad +4$

$1 = a$

$y = (x-0)^2 - 4$

9. A model rocket is shot straight upward with an initial speed of 800 ft/s, and the height of the rocket is given by h(t) = $800t - 16t^2$, where his measured in feet and t in seconds.

a) How many seconds does it take for the rocket to reach a height of 8000 feet? 36.13 seconds

$8000 = -16t^2 + 800t$

$= -16t^2 + 800t - 8000$

$\frac{-800 \pm \sqrt{(800)^2 - 4(-16)(-8000)}}{2(-16)} = \frac{-800 \pm \sqrt{1152,000}}{-32}$

b) How long does it take for the rocket to hit the ground?

50 sec

c) What is the maximum height of the rocket, and after how many seconds is this height reached?

h = 10,000

Sec = 25

10. If the parent function is f(x) = $x^2$, what are the transformations for the following equation. $g(x) = -2(x-3)^2 - 4$

- Reflect aross x-axis
- Right 3
- Down 4
- Stretch 2

11. If the parent function is f(x) = $\log_2 x$, what are the transformations f(x)= $\frac{3}{5}\log_2(x+8) + 5$

- Shrink by $\frac{3}{5}$
- Left 8
- Up 5