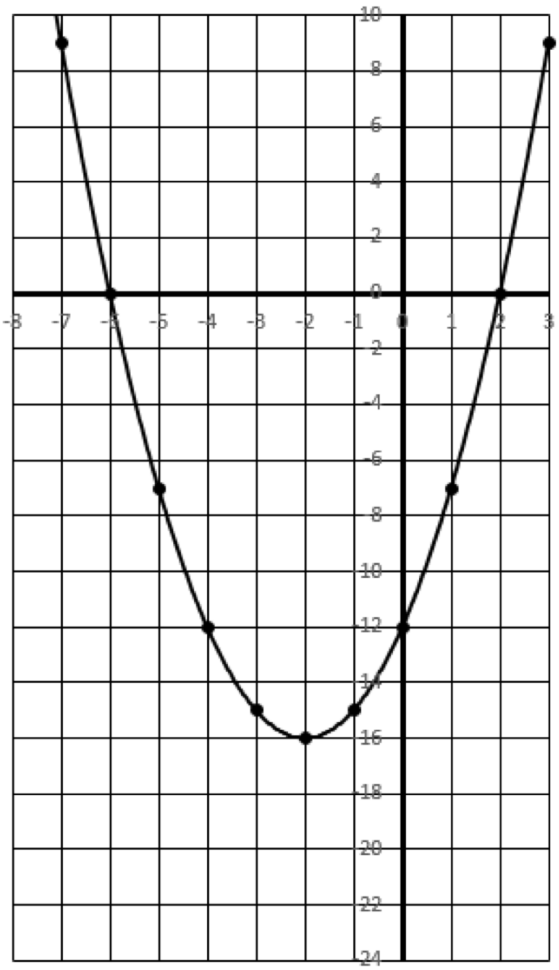
NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

Graph the following and identify the key features of the graph.

1. $f(x) = (x - 2)(x + 6)$

$x^2+4x-12$



x-intercepts: $x=2,-6$

y-intercept: -12

vertex: $(-2,-16)$

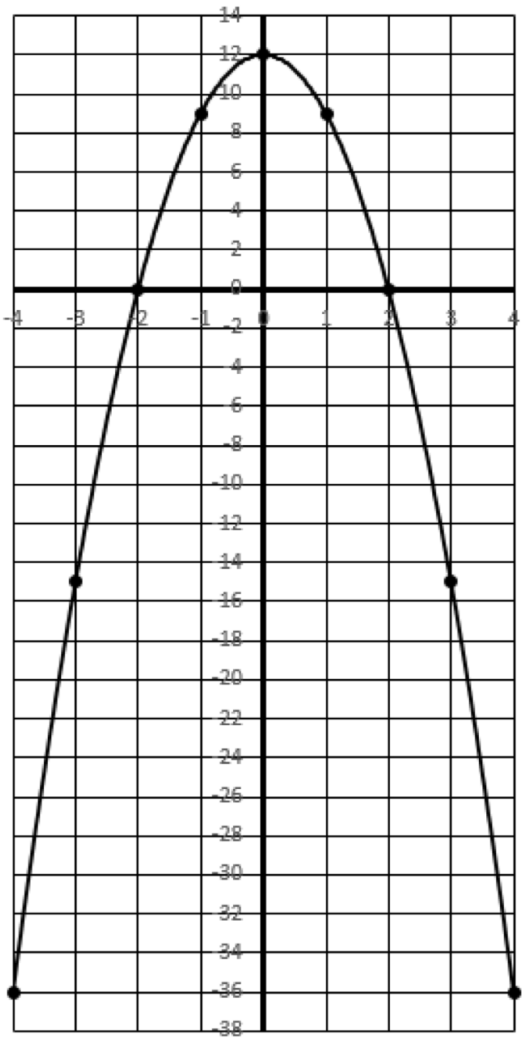
$f(-2)=$
$(-2)^2+4(-2)-12=-16$

axis of symmetry: $x=-2$

$x=\frac{-4}{2(1)}=-2$

2. $h(x) = -3(x - 2)(x + 2)$

y-int $h(0)=-3(0-2)(0+2)$
$-3(-2)(2)=12$



x-intercepts: $2,-2$

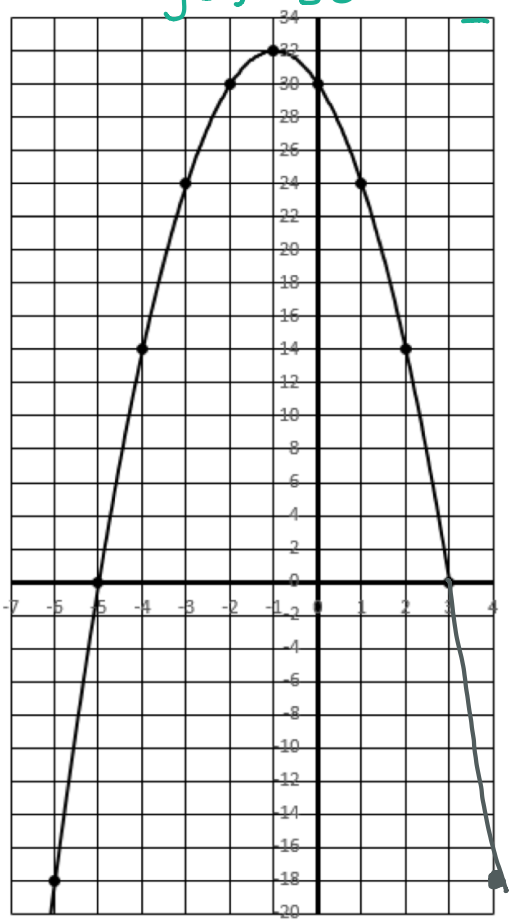
y-intercept: 12

vertex: $(0,12)$

axis of symmetry: $x=0$

3. $g(x) = -2(x - 3)(x + 5)$

$g(0) = -2(0-3)(0+5)$
$g(0) = 30$



x-intercepts: 3, −5

y-intercept: 30

vertex: (−1, 32)

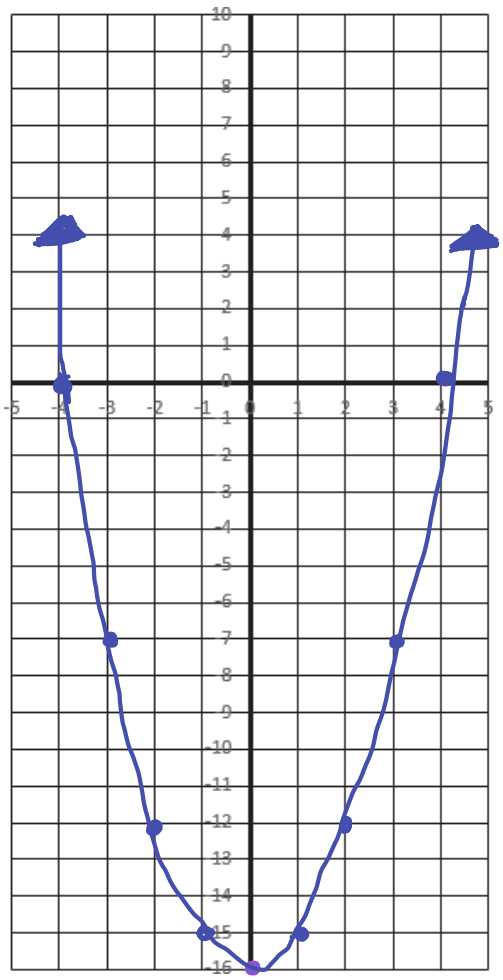
axis of symmetry: $x = -1$

$\frac{3+-5}{2} = -1$

$-2(-1-3)(-1+5)$
$-2(-4)(4) = 32$

4. $h(x) = x^2 - 16$

$h(x) = (x+4)(x-4)$
$h(0) = (0+4)(0-4) = -16$



x-intercepts: 4, −4

y-intercept: −16

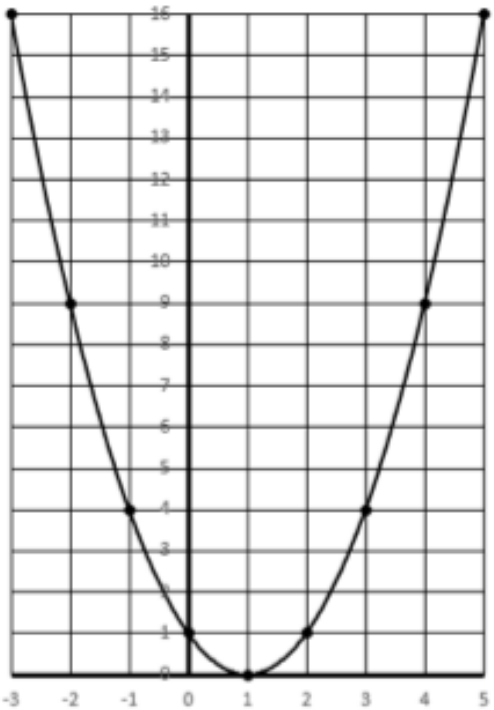
vertex: (0, −16)

axis of symmetry: $x = 0$

$x = \frac{-b}{2a} = \frac{0}{2(1)} = 0$

5. $p(x) = x^2 - 2x + 1$

$p(x) = (x-1)(x-1)$



x-intercepts: 1

y-intercept: 1

vertex: (1, 0)

axis of symmetry: $x = 1$

$x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = 1$

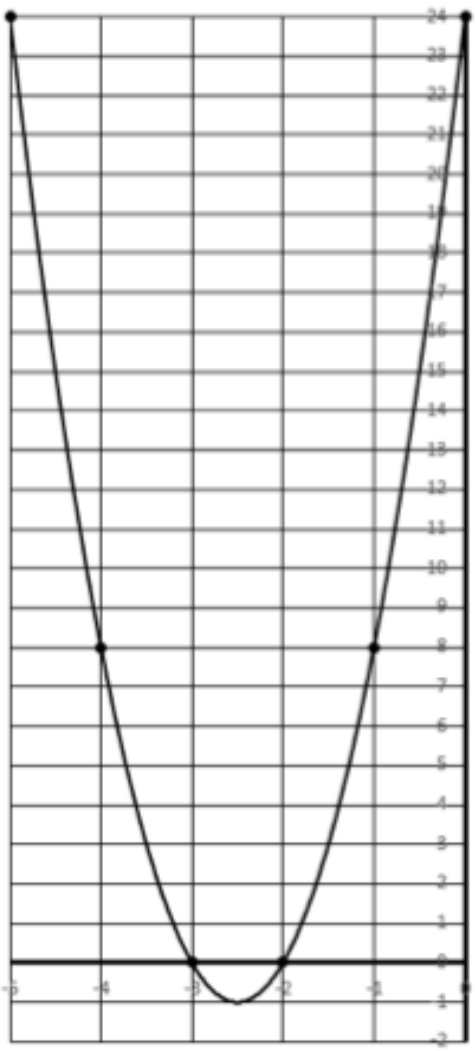
$p(1) = (1)^2 - 2(1) + 1$

$p(1) = 0$

6. $q(x) = 4x^2 + 20x + 24$

$4(x^2+5x+6)$

$4(x+3)(x+2)$



x-intercepts: $-3, -2$

y-intercept: 24

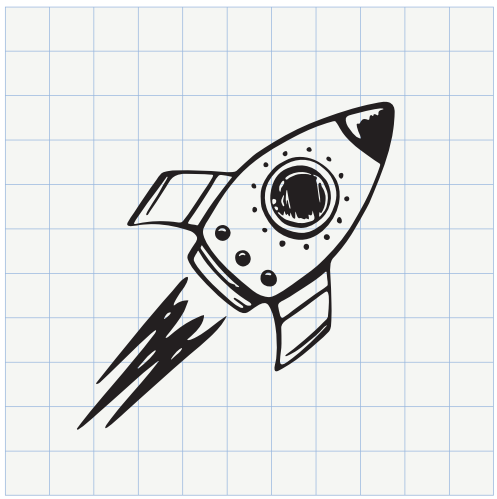
vertex: $(-\frac{5}{2}, -1)$

axis of symmetry: $x = -\frac{5}{2}$

$x = \frac{-5}{2(1)} = -\frac{5}{2}$

7. A rocket is launched from a cliff. The relationship between the height of the rocket, h, in feet, and the time since its launch, t, in seconds, can be represented by the following function:

$$h(t) = -16t^2 + 80t + 384.$$



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A. Sketch the graph of the motion of the rocket.

$h(t) = -16(t^2 - 5t - 24)$
$-16(t-8)(t+3)$

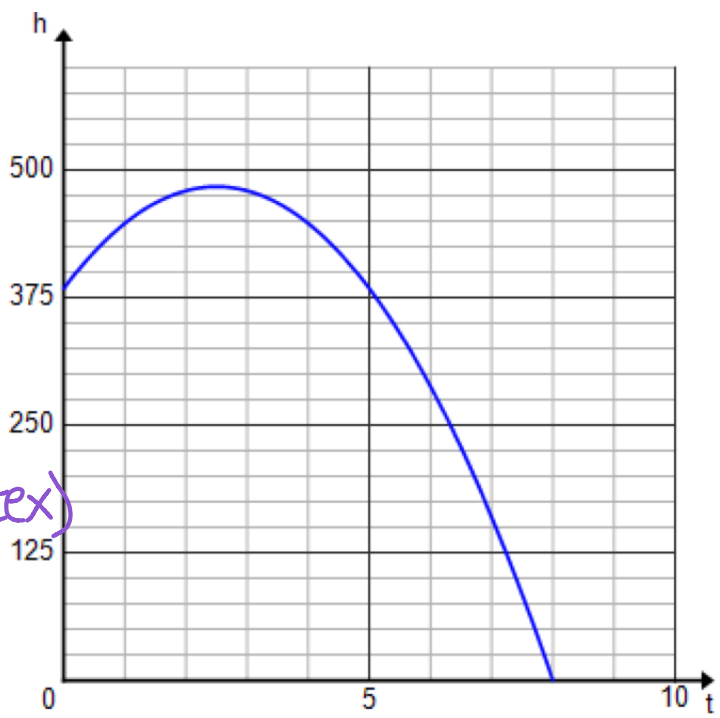
Key Features
x-int (8, -3)
y-int: (384)
axis of sym $x = 2.5$
vertex (2.5, 484)

B. When does the rocket hit the ground?

8 seconds (x-int)

C. When does the rocket reach its maximum height?

at 2.5 seconds (vertex)



D. What is the maximum height the rocket reaches?

484 feet (vertex)

E. At what height was the rocket launched?

384 feet (y-intercept)

8. Given the *x*-intercepts for the graph of a quadratic function, write a possible formula for the quadratic function, in factored form.

   A. *x*-intercepts: −1 and −6

   $f(x)=(x+1)(x+6)$

   B. *x*-intercepts: −2 and $\frac{2}{3}$

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

   OR

   $f(x)=a(x+2)(3x+2)$

   C. *x*-intercepts: −3 and 0

   $f(x)=ax(x+3)$

   D. *x*-intercept: 7

   $f(x)=a(x-7)^2$ OR

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

9. Suppose a quadratic function is such that its graph has *x*-intercepts of −3 and 2 and a *y*-intercept of 6.

   A. Write a formula for the quadratic function.

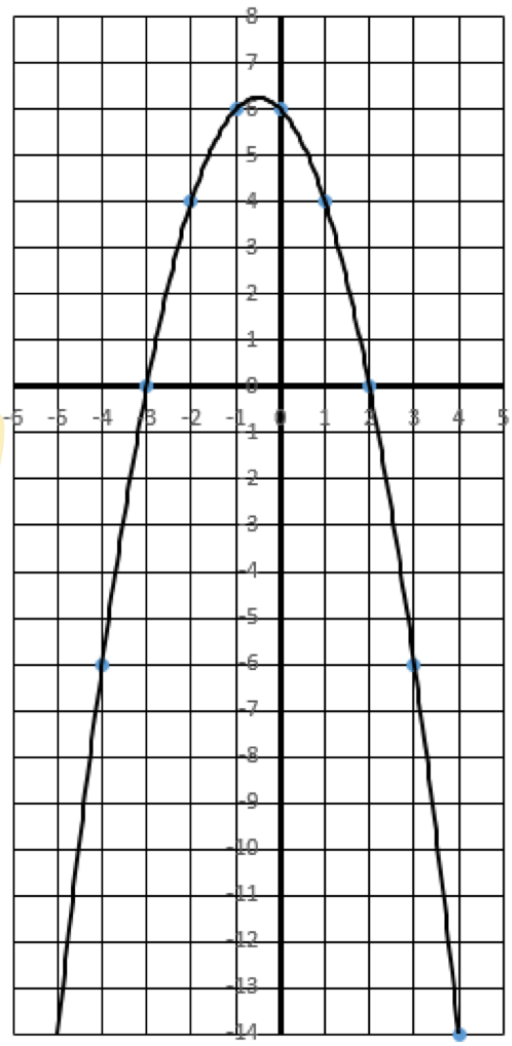
   (0, 6)

   $f(x)=a(x+3)(x-2)$

   $6=a(0+3)(0-2)$

   $6=a(3)(-2)$

   $6=-6a$

   $a=-1$ → $f(x)=-(x+3)(x-2)$

   B. Sketch the graph of the function.