Warmup:

Complete the Quadratic Functions Page you have been given.

You must match the 4 graphs to the 4 equations

AND

Write the Equation of the quadratic described and find the roots

1. Here are 4 equations of quadratic functions and 4 sketches of the graphs of quadratic functions.

A. $y = x^2 - 6x + 8$	B. $y = (x-6)(x+8)$	C. $y = (x-6)^2 + 8$	D. $y = -(x+8)(x-6)$

y-int

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

$x = 4 \quad x = 2$

$x = 6 \quad x = -8$

vertex $(6, 8)$

$-6x - 48$

$x^2 + 8x$

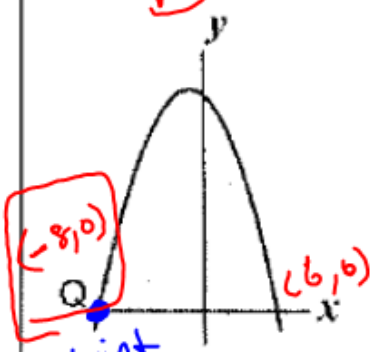
$x^2 + 2x - 48$

1. C

vertex

$P(6, 8)$

2. D



x-int

root

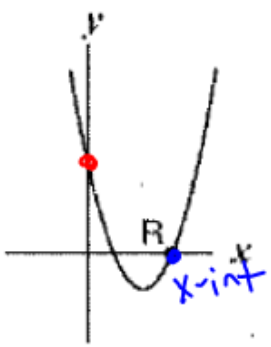
zero

$0 = -(x+8)(x-6)$

$-1 \neq 0 \quad x+8=0 \quad x-6=0$

$x = -8 \quad x = 6$

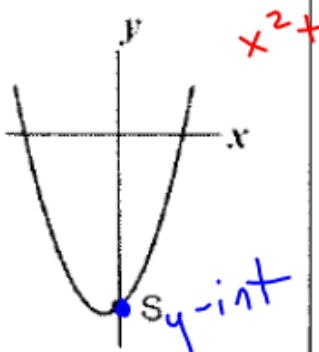
3. A



x-int

$R: (4, 0)$

4. B



y-int

$y = (0-6)(0+8)$

$-6 \cdot 8$

$y = -48$

$S: (0, -48)$

2. The graph of a quadratic function has a y intercept at (0,5) and a minimum at (3, −4).

a. Write the equation of its curve.

$0 = (x-3)^2 - 4$

$\sqrt{4} = \sqrt{(x-3)^2}$

b. Write the coordinates ~~of the root(s) of this quadratic function~~.

$\pm 2 = x - 3$

$+3 \quad +3$

$x = 3 \pm 2$

$x = 5$ or 1 (5 , 0) (1 , 0)

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

$y = (x-3)^2 - 4$

$y = a(x-3)^2 - 4$

$5 = a(0-3)^2 - 4$

$5 = a(-3)^2 - 4$

$+4 \quad +4$

$9 = a(-3)^2$

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

$a = 1$

HW #11 Answer Key

1. Vertex: $(2,-1)$
Point: $(4,3)$

$y = a(x-2)^2 - 1$

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

$3 = 4a - 1$

$4 = 4a$

$a = 1$

$y = 1(x-2)^2 - 1$

2. Vertex: $(-4,6)$
Point: $(-1,9)$

$y = a(x+4)^2 + 6$

$9 = a(-1+4)^2 + 6$

$9 = 9a + 6$

$\frac{3}{9} = \frac{9a}{9}$

$a = 3/9 = 1/3$

$y = \frac{1}{3}(x+4)^2 + 6$

3. Vertex: $(4, 5)$
Point: $(8, -3)$

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

$-3 = a(8-4)^2 + 5$

$-3 = 16a + 5$

$-8 = 16a$

$a = \frac{-8}{16} = \frac{-1}{2}$

$y = \frac{-1}{2}(x-4)^2 + 5$

4. Vertex: $(0, 0)$
Point: $(-2, -12)$

$y = a(x-0)^2 + 0$

or

$y = a(x)^2$

$-12 = a(-2)^2$

$-12 = 4a$

$a = \frac{-12}{4} = -3$

$y = -3x^2$

5. Vertex at (2, 2), passing through point (0, 0)

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

$0 = a(0-2)^2 + 2$

$0 = 4a + 2$

$-2 = 4a \qquad a = \frac{-2}{4} = \frac{-1}{2}$

$y = \frac{-1}{2}(x-2)^2 + 2$

6. Vertex at (−2,3), x-intercept of 1 $\Rightarrow$ (1,0)

$y = a(x+2)^2 + 3$

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

$0 = 9a + 3 \qquad -3 = 9a \qquad a = \frac{-3}{9} = \frac{-1}{3}$

$y = \frac{-1}{3}(x+2)^2 + 3$

7. Vertex at (4, 7), y-intercept of 10 $\Rightarrow$ $(0, 10)$

$y = a(x-4)^2 + 7$

$10 = a(0-4)^2 + 7$

$10 = 16a + 7$

$3 = 16a$

$a = \frac{3}{16}$

$$\boxed{y = \frac{3}{16}(x-4)^2 + 7}$$

8. $f(x)=x^2+4x+5$

$f(x)-5 = x^2+4x+\underline{4}$

$+4$

$f(x)-1 = (x+2)^2$

$\boxed{f(x) = (x+2)^2+1}$

9. $f(x)=2x^2-4x-3$

$f(x)+3 = 2(x^2-2x+\underline{1})$

$+2$

$f(x)+5 = 2(x-1)^2$

$\boxed{f(x) = 2(x-1)^2-5}$

10. $y=-x^2+6x-8$

$y+8 = -1(x^2-6x+\underline{9})$

-9

$y-1 = -1(x-3)^2$

$\boxed{y = -1(x-3)^2+1}$

11. $f(x)=-4x^2+16x-10$

$f(x)+10 = -4(x^2-4x+\underline{4})$

-16

$f(x)-6 = -4(x-2)^2$

$\boxed{f(x) = -4(x-2)^2+6}$

12. $y = (x + 5)^2 - 12$

$y = x^2 + 10x + 25 - 12$

$y = x^2 + 10x + 13$

13. $y = -(x - 7)^2 + 50$

$y = -1(x^2 - 14x + 49) + 50$

$y = -x^2 + 14x - 49 + 50$

$y = -x^2 + 14x + 1$

14. $y = 2(x + 1)^2 - 3$

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

$y = 2x^2 + 4x + 2 - 3$

$y = 2x^2 + 4x - 1$

15. $y = -2(x - 8)^2 + 140$

$y = -2(x^2 - 16x + 64) + 140$

$y = -2x^2 + 32x - 128 + 140$

$y = -2x^2 + 32x + 12$

Today we are going to work some area problems involving quadratic equations.

We will also look for key information from our quadratic equations to match equations with graphs.

We will work the first problem together:

Area = length • width

$28 = (x)(x+3)$

$28 = x^2 + 3x$

$-28 \qquad -28$

$0 = x^2 + 3x - 28$

$0 = (x+7)(x-4)$

$x = -7$ or $x = 4$ ✓

Find the value of *x*. $x = 4$

1. Area of the rectangle = 28

HW #12: Area Applications

The front page is made up of area problems.

The back of the page asks you to match some equations to their correct graphs.

- Use what you know about each form of a quadratic to look for key information that might help you pair up the equation with it's graph.