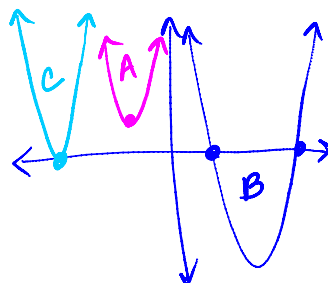# 11.6 HW Solutions

1. a. On the same set of axes, sketch three parabolas. Sketch one that has no zeros and label it A. Sketch a second one that has two zeros and label it B. Sketch a third one that has exactly one zero and label it C.
   b. Is it possible to sketch a parabola with more than two zeros? If so, make a sketch of it.

   Not possible

2. Complete the area model to the right to show the factors of the trinomial $x^2 + 8x + 12$. What are the factors?

   $(x+6)(x+2)$

	2	
	x	?
x	x^2	x^2
6 ?	$x+6$	12

Factor the polynomial. Use an area model if needed.

3. $2t^2 + 5t$
4. $m^2 + 12m + 20$
5. $y^2 - 17y - 18$
6. $2x^2 - 14x + 20$

3) $t(2t+5)$

4) $(m+10)(m+2)$

5) $(y-18)(y+1)$

6) $2(x^2 - 7x + 10)$
   $2(x-2)(x-5)$

Solve the equation by ⭕graphing. Estimate the solution if necessary.

7. $x^2 + 4x - 21 = 0$
8. $9k^2 = 144$
9. $4d^2 - 9d = 25$

$X = -7$
$X = 3$

$K = \pm 4$

$d = -1.62$
$d = 3.87$

Solve the equation by ⭕factoring.

10. $3x^2 - 5x = 0$
11. $2n^2 + 7n + 3 = 0$
12. $y^2 + 16 = 8y$

$X(3x-5)=0$
$X=0$ $3x-5=0$
       $3X=5$
       $x=5/_$

$(2n+1)(n+3)=0$
$2n+1=0$ $n+3=0$
$n=-1/2$ $n=-3$

$y^2 - 8y + 16 = 0$
$(y-4)(y-4)=0$
$y-4=0$

$3x = 5$

$x = 5/3$

$n = -\frac{1}{2}$

$n = -3$

$y - 4 = 0$

$y = 4$

13. Knowing the roots of a quadratic equation can help you factor the equation. For example, if the roots to the equation $x^2 - 7x + 10 = 0$ are 2 and 5, then $x = 2$ or $x = 5$. So the factors must be $(x - 2)$ and $(x - 5)$. You can check your factors by multiplying $(x - 2)$ by $(x - 5)$. The product $x^2 - 7x + 10$ confirms your factors.

  a. The roots to the equation $x^2 - 3x - 4 = 0$ are 4 and -1. Use this information to factor $x^2 - 3x - 4$.

  b. The roots to the equation $x^2 + 8x + 12 = 0$ are -6 and -2. Use this information to factor $x^2 + 8x + 12$.

a) $x = 4 \quad x = -1$

$x - 4 = 0 \quad x + 1 = 0$

$(x - 4)(x + 1) = 0$

b) $x = -6 \quad x = -2$

$x + 6 = 0 \quad x + 2 = 0$

$(x + 6)(x + 2) = 0$

14. A flare is launched from a life raft. The function $h = 192t - 16t^2$, where h represents the height of the flare in feet after t seconds, can be used to model the path of the flare.

  a. When is the flare 512 feet above the raft? after 4 and 8 seconds

  b. How long is the flare in the air? after 12 seconds

a) $512 = 192t - 16t^2$

$0 = -16t^2 + 192t - 512$

$0 = -16(t^2 - 12t + 32)$

$0 = -16(t - 8)(t - 4)$

$t = 8 \quad t = 4$

b) $0 = 192t - 16t^2$

$0 = -16t^2 + 192t$

$0 = -16t(t - 12)$

$t = 0 \quad t = 12$

The flare is on the ground at 0 secs and 12 secs.

15. A heavy brick is tossed into the air from a height of 48 feet. The function $h = -16t^2 + 32t + 48$ can be used to model the height h of the brick after t seconds. How long will it take for the brick to hit the ground?

$0 = -16t^2 + 32t + 48$

$0 = -16(t^2 - 2t - 3)$

$0 = -16(t - 3)(t + 1)$

$t = 3 \quad t = \cancel{-1}$

The brick will hit the ground in 3 seconds.

16. Solve $(x + 2)(x + 8) = 40$ by factoring.

$x^2 + 10x + 16 = 40$

$x^2 + 10x - 24 = 0$

$(x + 12)(x - 2) = 0$

$x = -12 \quad x = 2$

17. Some quadratic equations can be solved by taking the square root of each side of the equation. For example,

Original equation	$3t^2 = 36$
Divide both sides by 3.	$t^2 = 12$
Take the square root of each side.	$t = \pm\sqrt{12}$
Simplify.	$t = \pm 2\sqrt{3}$
Approximate the roots.	$t \approx 3.5$ and $t \approx -3.5$

a. Solve $8x^2 - 32 = 0$ for x.

b. Solve $(x + 4)^2 = 7$ for x. Leave your answer in radical form.

a) $8x^2 - 32 = 0$
$$8x^2 = 32$$
$$x^2 = 4$$
$$\boxed{x = \pm 2}$$

b) $(x+4)^2 = 7$
$$x+4 = \pm\sqrt{7}$$
$$\boxed{x = -4 \pm \sqrt{7}}$$