# Starter

Get out your 3.7 packet and make sure #5-15 on pg.47-48 are finished.  We will go over questions shortly and turn in 3.7 today.

For each of the given quadratic equations find the solutions using an efficient method. State the method you are using as well as the solutions. You must use at least three different methods.

5.   $x^2 + 17x + 60 = 0$        6.   $x^2 + 16x + 39 = 0$        7.   $x^2 + 7x - 5 = 0$

$a=1$
$b=16$
$c=39$

$(x+3)(x+13)=0$

$x = -3, -13$

8.   $3x^2 + 14x - 5 = 0$       9.   $x^2 - 12x = -8$       10.   $x^2 + 6x = 7$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-16 \pm \sqrt{16^2 - 4 \cdot 1 \cdot 39}}{2 \cdot 1}$$

$$x = \frac{-16 \pm \sqrt{256 - 156}}{2}$$

$4 \cdot 30 = 120$
$4 \cdot 9 = 36$

$$x = \frac{-16 \pm \sqrt{100}}{2}$$

$$x = \frac{-16 \pm 10}{2} \Rightarrow \frac{-16 + 10}{2} = \frac{-6}{2} = -3 \quad \& \quad \frac{-16 - 10}{2} = \frac{-26}{2} = -13$$

$$\boxed{x = -3, -13}$$

**33.** Find the equation of the quadratic function $f$ whose graph is shown below.



$(-5, 7)$
$(-3, 7)$
$(-4, 5)$
vertex

$(h, k)$
$(-4, 5)$
$h = -4$
$k = 5$

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

BTW
$i = \sqrt{-1}$
$i^2 = -1$

$$x = \frac{2 \pm \sqrt{-16}}{12} = \frac{2 \pm \sqrt{-1}\sqrt{16}}{12}$$

$$= \frac{2 \pm 4i}{12} = \frac{2}{12} \pm \frac{4i}{12} =$$

$$\frac{1}{6} \pm \frac{1}{3}i$$

**32.** Use the quadratic formula to solve for $x$.

$2x^2 + 5x - 1 = 0$

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$$x = \frac{1}{6} + \frac{1}{3}i, \frac{1}{6} - \frac{1}{3}i$$

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○ Function 2

What is the larger maximum value?

**44.** Multiply.
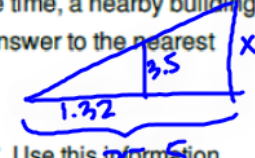
$$(-3+6i)(-4+3i) = (-3)(-4) + (-3)(3i) + 6(-4) + (6i)(3i)$$

$$i = \sqrt{-1}$$
$$i^2 = -1$$

$$= 12 - 9i - 24 + 18i^2$$

$$= -12 - 9i + 18(-1)$$

$$= -12 - 9i - 18$$

$$= \boxed{-30 - 9i}$$

$$a + bi$$

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**13.** A pole that is 3.5 m tall casts a shadow that is 1.32 m long. At the same time, a nearby building casts a shadow that is 35.5 m long. How tall is the building? Round your answer to the nearest meter.

*(handwritten annotations: triangle with 3.5, 1.32, 35.5, x)*

$$\frac{3.5}{1.32} = \frac{x}{35.5}$$

**17.** In the circle below, $K$ is the center, $\overline{LN}$ is a diameter, and $m\angle LKM = 70°$. Use this information to find the following.

*(circle diagram with center K, points N, P, L, M; angles 110°, 10°, 70°, 180°)*

(a) Give a central angle  $\angle LKM$
$\angle NKM$  or  $\angle LKM$

(b) Give a minor arc  $\overset{\frown}{NM}, \overset{\frown}{ML}, \overset{\frown}{PL}, \overset{\frown}{PN}$

(c) Give a semicircle  semicircle LMN  or  semicircle LPN

(d) Find $m\overset{\frown}{LM} = 70°$

(e) Find $m\overset{\frown}{LMN}$    $180°$

**8.** In the figure below, $\triangle BCA \sim \triangle BDC \sim \triangle CDA$.

Fill in the following blanks using the lengths $a, b, c, x,$ and $y$.

**Part 1:** Complete the proportions.

$$\frac{b}{x} = \frac{c}{b} \qquad\qquad \frac{a}{y} = \frac{c}{a}$$

**Part 2:** Use the method of cross products to rewrite the equations in Part 1.

$$b^2 = c\cdot\underline{\phantom{x}} \qquad\qquad a^2 = c\cdot\underline{\phantom{x}}$$

**Part 3:** Use Part 2 to fill in the blanks.

$$a^2 + b^2 = c\cdot\underline{\phantom{x}} + c\cdot\underline{\phantom{x}}$$

**Part 4:** Factor the right-hand side of Part 3.

$$a^2 + b^2 = c(\underline{\phantom{x}} + \underline{\phantom{x}})$$

**Part 5:** Use the Segment Addition Property.

$$y + x = \underline{\phantom{x}}$$
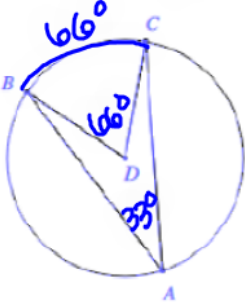
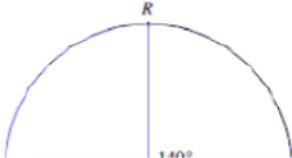Part 6: Use Part 5 to rewrite the equation in Part 4.

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**16.** The circle below has center $D$. Suppose that $m \overset{\frown}{BC} = 66°$. Find the following.

(a) $m\angle BDC = 66°$
(b) $m\angle BAC = \frac{1}{2} \cdot 66 = 33°$

$66°$

$66°$

$33°$

**19.** The circle below has center $P$, and its radius is 7 ft. Given that $m\angle QPR = 140°$, find the length of the major arc $\overset{\frown}{QSR}$.

Give an exact answer in terms of $\pi$, and be sure to include the correct unit in your answer.

$140°$

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$$a = 2$$
$$b = 5$$
$$c = -1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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