

*Key*

Date \_\_\_\_\_

### Solving Quadratic Equations by Quadratic Formula

When  $ax^2 + bx + c = 0$ , you can use Quadratic Formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  to find solutions.

Before we solve Quadratic Formula, we need to practice simplifying radicals.

1.  $\sqrt{(-4)^2 - 4(1)(-2)}$   
 $\sqrt{16+8}$   
 $\sqrt{24} = 2\sqrt{6}$

2.  $\sqrt{(2)^2 - 4(-2)(12)}$   
 $\sqrt{4+96}$   
 $\sqrt{100} = 10$

3.  $\frac{3 \pm \sqrt{25}}{4}$       $\frac{8}{4}, \frac{-2}{4}$   
 $\frac{3 \pm 5}{4}$       $\left[ 2, -\frac{1}{2} \right]$

4.  $\frac{-2 \pm \sqrt{20}}{5}$   
 $\left[ \frac{-2 + 2\sqrt{5}}{5}, \frac{-2 - 2\sqrt{5}}{5} \right]$

5.  $\frac{4 \pm \sqrt{18}}{4}$   
 $\frac{4}{4} \pm \frac{3\sqrt{2}}{4}$   
 $\left[ 1 \pm \frac{3\sqrt{2}}{4} \right]$

6.  $\frac{6 \pm \sqrt{27}}{12}$   
 $\frac{6}{12} \pm \frac{3\sqrt{3}}{12}$   
 $\left[ \frac{1}{2} \pm \frac{\sqrt{3}}{4} \right]$

Use the quadratic formula to find the zeros.

7.  $f(x) = x^2 - 6x + 3$   
 $a=1$   
 $b=-6$   
 $c=3$   
 $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(3)}}{2(1)}$   
 $x = \frac{6 \pm \sqrt{24}}{2}$   
 $x = \frac{6}{2} \pm \frac{2\sqrt{6}}{2}$       $\left[ x = 3 \pm \sqrt{6} \right]$

8.  $f(x) = x^2 + 9x + 10$   
 $a=1$   
 $b=9$   
 $c=10$   
 $x = \frac{-9 \pm \sqrt{9^2 - 4(1)(10)}}{2(1)}$   
 $x = \frac{-9 \pm \sqrt{41}}{2}$   
 $\left[ x = -\frac{9}{2} \pm \frac{\sqrt{41}}{2} \right]$

9.  $2x^2 - 4 = 5x$       $2x^2 - 5x - 4 = 0$   
 $a=2$   
 $b=-5$   
 $c=-4$   
 $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-4)}}{2(2)}$   
 $x = \frac{5 \pm \sqrt{57}}{4}$   
 $\left[ x = \frac{5}{4} \pm \frac{\sqrt{57}}{4} \right]$

10.  $2x^2 - 4x = 1$       $2x^2 - 4x - 1 = 0$   
 $a=2$   
 $b=-4$   
 $c=-1$   
 $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-1)}}{2(2)}$   
 $x = \frac{4 \pm \sqrt{24}}{4}$   
 $x = \frac{4}{4} \pm \frac{2\sqrt{6}}{4} = \left[ 1 \pm \frac{\sqrt{6}}{2} \right]$

3.12 Practice - Solving Quadratics Using the Quadratic Formula

Date \_\_\_\_\_

Solve each equation with the quadratic formula.

1)  $4k^2 - 20 = k$   $4k^2 - k - 20 = 0$

2)  $2n^2 = 63 - 5n$

$a=4$   
 $b=-1$   
 $c=-20$   
 $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(4)(-20)}}{2(4)}$

$x = \frac{1 \pm \sqrt{321}}{8}$

$x = \frac{1 \pm \sqrt{321}}{8}$

3)  $3n^2 + 6n = 45$   $3n^2 + 6n - 45 = 0 \Rightarrow n^2 + 2n - 15 = 0$  4)  $8b^2 + 6 = -5b$

$a=1$   
 $b=2$   
 $c=-15$   
 $x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-15)}}{2(1)}$

$x = \frac{-2 \pm \sqrt{64}}{2}$

$x = \frac{-2 \pm 8}{2} = \frac{6}{2}, \frac{-10}{2} = \boxed{3, -5}$

5)  $5a^2 - 90 = -7a$   $5a^2 + 7a - 90 = 0$

6)  $2x^2 - 4x = 3$

$a=5$   
 $b=7$   
 $c=-90$   
 $x = \frac{-7 \pm \sqrt{7^2 - 4(5)(-90)}}{2(5)}$

$x = \frac{-7 \pm \sqrt{849}}{10}$

$x = \frac{-7 \pm 29}{10} = \frac{36}{10}, \frac{-50}{10} = \boxed{\frac{18}{5}, -5}$

7)  $2a^2 - 14 = 0$   $a^2 - 7 = 0$

8)  $10a^2 - 10a = 16$

$a=1$   
 $b=0$   
 $c=-7$   
 $x = \frac{-0 \pm \sqrt{0^2 - 4(1)(-7)}}{2(1)}$

$x = \pm \frac{\sqrt{28}}{2}$

$x = \pm \frac{2\sqrt{7}}{2} = \pm \sqrt{7}$

9)  $n^2 - 5n = 50$   $n^2 - 5n - 50 = 0$

10)  $10v^2 = 9v - 6$

$a=1$   
 $b=-5$   
 $c=-50$   
 $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-50)}}{2(1)}$

$x = \frac{5 \pm \sqrt{225}}{2}$

$x = \frac{5 \pm 15}{2} = \frac{20}{2}, \frac{-10}{2} = \boxed{10, -5}$

11)  $10m^2 - 5m = -3$   $10m^2 - 5m + 3 = 0$

12)  $4r^2 - 36 = 0$

$a=10$   
 $b=-5$   
 $c=3$   
 $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(10)(3)}}{2(10)}$

$x = \frac{5 \pm \sqrt{95}}{20}$

No real

ANSWER