

Name: _____ Date: _____

Solving Quadratic Equations

Solve each of the following quadratic equations using the best method.

1. $2x^2 + 11x + 5 = 0$

$(2x+1)(x+5) = 0$

$2x+1=0$ $x+5=0$
 $2x=-1$ $x=-5$
 $x=-\frac{1}{2}$ $x=-5$

2. $4(x+9)^2 = 120$

**Best Method:
Square Rooting!**

$x = -9 \pm \sqrt{30}$

3. $2x^2 + 7x + 6 = 0$

$(2x+3)(x+2) = 0$

$2x+3=0$ $x+2=0$
 $2x=-3$ $x=-2$
 $x=-\frac{3}{2}$ $x=-2$

4. $\frac{1}{2}(x-2)^2 + 4 = 22$

**Best Method:
Square Rooting**

$x = 8$ & $x = -4$

5. $3x^2 - 7 = 2x$

$3x^2 - 2x - 7 = 0$

$2 \pm \sqrt{(-2)^2 - 4(3)(-7)}$

$2 \pm \sqrt{88}$

$2 \pm \sqrt{2 \cdot 2 \cdot 2 \cdot 11}$

$2 \pm 2\sqrt{11} = \frac{1 \pm \sqrt{11}}{3}$

88
 \uparrow
 2 44
 \uparrow
 2 22
 \uparrow
 2 11

6. $3x^2 - 14x = 5$

**Best Method:
Factoring**

$x = 5$ & $x = -\frac{1}{3}$

7. $-16 + \frac{1}{5}x^2 = -8$

$\frac{1}{5}x^2 = 8$

$x^2 = 40$

$x = \pm \sqrt{40}$

$x = \pm \sqrt{2 \cdot 2 \cdot 2 \cdot 5}$

$x = \pm 2\sqrt{10}$

8. $9 = 12x - 4x^2$

**Best Method:
Quadratic Formula**

$x = \frac{3 \pm 3\sqrt{2}}{2}$

9. $2x^2 = 14 - x$

$2x^2 + x - 14 = 0$

$-1 \pm \sqrt{(1)^2 - 4(2)(-14)}$

$\frac{-1 \pm \sqrt{57}}{4}$

Solve each of the following quadratic equations using the best method.

$$10. x^2 - 8x - 73 = 0$$

Best Method:
Square Rooting

$$x = 4 \pm \sqrt{89}$$

$$11. 8x^2 + 3 = 331$$

$$\frac{8x^2}{8} = \frac{328}{8}$$

$$x^2 = 41$$

$$\sqrt{x^2} = \pm \sqrt{41}$$

$$x = \pm \sqrt{41}$$

$$12. 4x^2 - 2x - 5 = 0$$

Best Method:
Quadratic Formula

$$x = \frac{1 \pm \sqrt{21}}{4}$$

$$13. x^2 - x - 56 = 0$$

$$(x + 7)(x - 8) = 0$$

$$x + 7 = 0 \quad x - 8 = 0$$

$$x = -7 \quad x = 8$$

$$14. x^2 + 3x = 40$$

Best Method:
Factoring

$$x = 5 \text{ or } -8$$

$$15. x^2 + 7x + 6 = 0$$

$$(x + 1)(x + 6) = 0$$

$$x + 1 = 0 \quad x + 6 = 0$$

$$x = -1 \text{ or } x = -6$$

$$16. (x - 5)^2 - 3 = 42$$

Best Method:
Square Rooting

$$x = 5 \pm 3\sqrt{5}$$

$$17. x^2 - 71 = 16x$$

$$x^2 - 16x - 71 = 0$$

$$x^2 - 16x + 64 = 71 + 64$$

$$\left(\frac{-16}{2}\right)^2 = 64$$

$$\sqrt{(x - 8)^2} = \sqrt{135}$$

$$x - 8 = \pm \sqrt{3 \cdot 3 \cdot 3 \cdot 5}$$

$$x = 8 \pm 3\sqrt{15}$$

$$18. 9x^2 + 10x - 10 = 0$$

Best Method:
Quadratic Formula

$$x = \frac{-5 \pm \sqrt{115}}{9}$$

Square Roots	Factoring	Completing the Square	Quadratic Formula
$3x^2 - 7 = 47$ $+7 \quad +7$ $3x^2 = 54$ $x^2 = 18$ $x = \pm \sqrt{2 \cdot 3 \cdot 3}$ $x = \pm 3\sqrt{2}$	$x^2 + 6x + 5 = 0$ $(x+1)(x+5) = 0$ $x+1=0 \text{ \& } x+5=0$ $x=-1 \text{ \& } x=-5$	$x^2 - 12x - 71 = 0$ $x^2 - 12x + 36 = 71 + 36$ $(x-6)^2 = 107$ $x-6 = \pm\sqrt{107}$ $x = 6 \pm \sqrt{107}$	$x^2 + 6x + 3 = 0$ $a=1$ $b=6$ $c=3$ $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\frac{-6 \pm \sqrt{(6)^2 - 4(1)(3)}}{2(1)}$ $\frac{-6 \pm \sqrt{24}}{2} = \frac{-6 \pm \sqrt{2 \cdot 2 \cdot 2 \cdot 3}}{2}$ $\frac{-6 \pm 2\sqrt{6}}{2} = -3 \pm \sqrt{6}$
$x^2 - 21 = 4$ $+21 \quad +21$ $x^2 = 25$ $x = \pm 5$	$x^2 - x - 12 = 0$ $(x-4)(x+3) = 0$ $x=4 \text{ \& } x=-3$	$x^2 - 16x - 19 = 0$ $x^2 - 16x + 64 = 19 + 64$ $(x-8)^2 = 83$ $x-8 = \pm\sqrt{83}$ $x = 8 \pm \sqrt{83}$	$2x^2 + 2x + 9 = x^2$ $-x^2$ $x^2 + 2x + 9 = 0$ $\frac{-2 \pm \sqrt{(2)^2 - 4(1)(9)}}{2(1)}$ $\frac{-2 \pm \sqrt{-32}}{2}$ <p>No Solution</p>
$\frac{2}{3}x^2 - 3 = 7$ $+3 \quad +3$ $\frac{2}{3}x^2 = 10$ $2x^2 = 30$ $x^2 = 15$ $x = \pm\sqrt{15}$	$x^2 - 2x = 24$ $x^2 - 2x - 24 = 0$ $(x+4)(x-6) = 0$ $x=-4 \text{ \& } x=6$	$x^2 + 8x - 51 = 0$ $x^2 + 8x + 16 = 51 + 16$ $(x+4)^2 = 67$ $x+4 = \pm\sqrt{67}$ $x = -4 \pm \sqrt{67}$	$4x^2 + 28x = -49$ $4x^2 + 28x + 49 = 0$ $\frac{-28 \pm \sqrt{(28)^2 - 4(4)(49)}}{2(4)}$ $\frac{-28 \pm \sqrt{0}}{8}$ $\frac{-28}{8}$ $-\frac{7}{2}$
$5(x-4)^2 = 125$ $(x-4)^2 = 25$ $x-4 = \pm 5$ $x = 9 \text{ \& } x = -1$	$3x^2 - 3x - 126 = 0$ $x^2 - x - 42 = 0$ $(x+6)(x-7) = 0$ $x = -6 \text{ \& } x = 7$	$(\frac{14}{2})^2 x^2 + 14x - 27 = 8$ $x^2 + 14x + 49 = 35 + 49$ $(x+7)^2 = 84$ $x+7 = \pm\sqrt{84}$ $x = -7 \pm \sqrt{2 \cdot 2 \cdot 3 \cdot 7}$ $x = -7 \pm 2\sqrt{21}$	
$\frac{1}{3}(x+4)^2 - 1 = 5$ $(x+4)^2 = 18$ $x+4 = \pm\sqrt{2 \cdot 3 \cdot 3}$ $x = -4 \pm 3\sqrt{2}$	$2x^2 - 3x = 9$ $2x^2 - 3x - 9 = 0$ $(2x+3)(x-3) = 0$ $x = -3/2 \text{ \& } x = 3$	$x^2 + 17 = 12x$ $x^2 - 12x + 36 = -17 + 36$ $(x-6)^2 = 19$ $x-6 = \pm\sqrt{19}$ $x = 6 \pm \sqrt{19}$	
$2(x^2 - 5) = -x^2 - 1$ $2x^2 - 10 = -x^2 - 1$ $+x^2 + 10 \quad +x^2 + 10$ $3x^2 = 9$ $x^2 = 3$ $x = \pm\sqrt{3}$	$4x^2 - 9 = 0$ $(2x-3)(2x+3) = 0$ $x = 3/2$		
	$2x^2 - 7x = x^2 - 12$ $-x^2$ $x^2 - 7x + 12 = 0$ $(x-3)(x-4) = 0$ $x = 3 \text{ \& } x = 4$		