

## Warm-Up : Solve

$$1) x^2 + 14x - 6 = 0$$

$$x^2 + 14x + 49 = 6 + 49$$

$$\sqrt{(x+7)^2} = \sqrt{55}$$

$$x+7 = \pm\sqrt{55}$$

$$x = \boxed{-7 \pm \sqrt{55}} \text{ Sol}$$

$$x^2 + 14x + 49 = 55$$

$$(x+7)^2 = 55$$

$$(x+7)^2 - 55 = 0$$

$$(-7, -55)$$

$$2) 2x^2 - 4x + 7 = 0$$

$$2x^2 - 4x = -7$$

$$2(x^2 - 2x + 1) = -7 + 2 \cdot 1$$

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

$$\sqrt{(x-1)^2} = \sqrt{\frac{-5}{2}}$$

$$x-1 = \pm i\sqrt{5/2}$$

$$\boxed{x = 1 \pm i\sqrt{5/2}}$$

$$1 + i\sqrt{5/2} \text{ or } 1 - i\sqrt{5/2}$$

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

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

$$\uparrow \text{ v.i. } (1, 5)$$

$$\text{S by R1 \quad \cup S}$$

$$x = \pm 4\sqrt{5} - 8 \quad 3(x^2 - 2x + 1)$$

3.  $x^2 + 12x + 43 = 0$

$$x^2 + 12x + 36 = -43 + 36$$

$$\sqrt{(x+6)^2} = \sqrt{-7}$$

$$x+6 = \pm i\sqrt{7}$$

$$x = \pm i\sqrt{7} - 6$$

4.  $3x^2 - 6x - 45 = 0$

$$3x^2 - 6x + \underline{\quad} = 45 + \underline{\quad}$$

$$3(x^2 - 2x + \underline{1}) = 45 + 3 \cdot \underline{1}$$

$$\frac{3(x-1)^2}{3} = \frac{48}{3}$$

$$\sqrt{(x-1)^2} = \sqrt{16}$$

$$x-1 = \pm 4$$

$$x = 1 \pm 4$$

- 1) BEGIN with  $ax^2 + bx + c = 0$  and MULTIPLY "a" to "c"
- 2) REWRITE  $x^2 + bx = -c \cdot a$
- 3)  $x^2 + bx + \underline{\quad} = -c \cdot a + \underline{\quad}$
- 4) COMPLETE THE SQUARE by taking half of b; square it and ADD IT TO BOTH SIDES of the equation in the blanks.
- 5) FACTOR the perfect square trinomial.
- 6) Take the SQUARE ROOT of both sides. Don't forget to include a  $\pm$  to create 2 solutions.
- 7) SOLVE both equations. SIMPLIFY all irrational and complex solutions.
- 8) DIVIDE by "a" and REDUCE all final solutions.

$$x = 5 \text{ or } -3$$

5.  $3x^2 + 10x - 8 = 0$

$$3(x^2 + \frac{10}{3}x + \frac{100}{36}) = \frac{49}{3}$$

$$\sqrt{3(x + \frac{10}{6})^2} = \sqrt{\frac{49}{3}}$$

$$x + \frac{10}{6} = \pm \frac{7}{\sqrt{3}}$$

$$x = -4, \frac{2}{3}$$

6.  $4x^2 - 8x + 3 = 0$

$$x^2 - 2x + \frac{3}{4} = 0$$

$$(x - \frac{1}{2})(x - \frac{3}{2}) = 0$$

$$x = \frac{1}{2}, \frac{3}{2}$$

7.  $4x^2 - 16x + 71 = 0$

$$4(x^2 - 4x + \underline{4}) = -71 + 4 \cdot \underline{4}$$

$$\sqrt{4(x-2)^2} = \sqrt{\frac{-55}{4}}$$

$$x-2 = \pm i\sqrt{\frac{55}{4}}$$

$$x = 2 \pm i\sqrt{\frac{55}{4}}$$

8.  $3x^2 + 6x - 4 = 0$

$$3(x^2 + 2x + \underline{1}) = 4 + 3 \cdot \underline{1}$$

$$\sqrt{3(x+1)^2} = \sqrt{\frac{7}{3}}$$

$$x+1 = \pm \sqrt{\frac{7}{3}}$$

$$x = -1 \pm \sqrt{\frac{7}{3}}$$

Math 2 – Honors  
 Unit 3 – Quadratic Functions Continued  
 Lesson 3 → Completing the Square HOMEWORK

Name \_\_\_\_\_  
 Date \_\_\_\_\_ Pd \_\_\_\_\_

SOLVE BY COMPLETING THE SQUARE:

<p>1. <math>x^2 + 14x - 51 = 0</math></p>	<p>2. <math>x^2 - 12x + 23 = 0</math></p>
<p>3. <math>x^2 - 4x + 6 = 0</math></p>	<p>4. <math>x^2 - 10x + 18 = 0</math></p>
<p>5. <math>x^2 + 18x - 40 = 0</math></p>	<p>6. <math>4x^2 + 4x + 36 = 0</math></p>
<p>7. <math>x^2 + 2x + 20 = 0</math></p>	<p>8. <math>3x^2 + 12x + 21 = 0</math>  <math>\quad\quad\quad -21 \quad -21</math>  <math>3x^2 + 12x = -21</math>  <math>3(x^2 + 4x + 4) = -21 + 3 \cdot 4</math>  <math>3(x+2)^2 = \frac{-9}{3}</math>  <math>\sqrt{(x+2)^2} = \sqrt{-3}</math>  <math>x+2 = \pm i\sqrt{3}</math>  <math>x = -2 \pm i\sqrt{3}</math></p>