Find the exact solution to each by completing the square

1. $x^2 - 20x + 7 = 0$

2. $4x^2 + 32x - 20 = 0$

1. $x^2 - 20x + 7 = 0$

$x^2 - 20x + 100 = -7 + 100$

$\sqrt{(x-10)^2} = \sqrt{93}$

$x - 10 = 10 \pm \sqrt{93}$

$+10 \quad +10$

2. $4x^2 + 32x - 20 = 0$

$\frac{4}{4} \quad \frac{}{4}$

$x^2 + 8x - 5 = 0$

$x^2 + 8x + 16 = 5 + 16$

$\sqrt{(x+4)^2} = \sqrt{21}$

$x + 4 = -4 \pm \sqrt{21}$

$-4 \quad -4$

3. $-4x^2 - 10x + 14 = 0$

$\frac{-4x^2}{-4} \quad \frac{-10x}{-4} \quad \frac{=-14}{-4}$

$x^2 + \frac{5}{2}x + \frac{25}{16} = \frac{8}{8} \cdot \frac{7}{2} + \frac{25}{16} = \frac{56}{16} + \frac{25}{16}$

$\sqrt{(x+\frac{5}{4})^2} = \sqrt{\frac{81}{16}}$

$x + \frac{5}{4} = \pm \frac{9}{4}$

$-\frac{5}{4} \quad -\frac{5}{4}$

$x = 1, -\frac{7}{2}$

Completing the Square to write an equation in Vertex Form.

$y = x^2 + 6x - 11$ ⟶ $y = a(x-h)^2 + k$

Rearrange so that one side is only $x^2 + bx$

$y + 11 = x^2 + 6x$

Complete the square

$y + 11 + 9 = x^2 + 6x + 9$

$y + 20 = (x + 3)^2$

$y = (x + 3)^2 - 20$ Vertex is (-3, -20)

Write each equation into Vertex Form:

1. $y = x^2 + 8x + 3$

$-3 \quad -3$

$y - 3 = x^2 + 8x + 16$

$+16$

$y + 13 = (x+4)^2$

$y = (x+4)^2 - 13$

2. $y = x^2 - 18x - 5$

$+5 \quad +5$

$y + 5 = x^2 - 18x + 81$

$+81$

$y + 86 = (x-9)^2$

$y = (x-9)^2 - 86$

Write each equation into Vertex Form:

3. $y = -x^2 + 12x - 19$

$+19 \quad +19$

$\frac{y+19}{-1} = \frac{-x^2 + 12x}{-1}$

$-y - 19 = x^2 - 12x + 36$

$+36$

$-y + 17 = (x-6)^2$

$-17 \quad -17$

$-y = (x-6)^2 - 17$

$\frac{-y}{-1} = \frac{(x-6)^2 - 17}{-1}$

$y = -(x-6)^2 + 17$

You can now do Hwk #21 Sec 5-7

Due Friday

Pages 285-286

Problems ~~13~~, 14, 17, 21, 28, 29, 42, 43, 46

Solve using square roots:

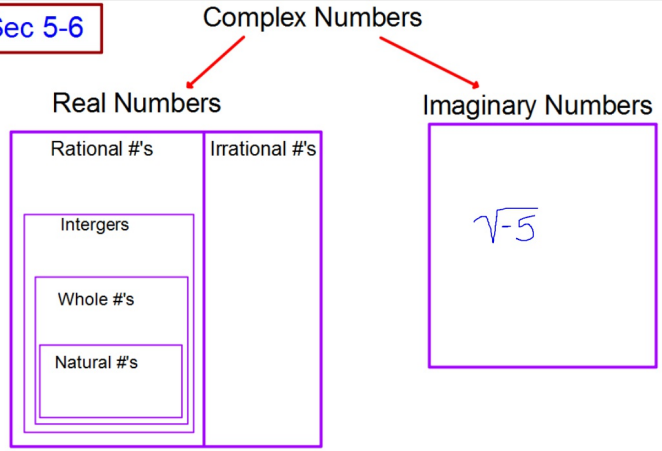
$8 - 2x^2 = 40$

$-8 \quad -8$

$\frac{-2x^2}{-2} = \frac{32}{-2}$ $\quad \sqrt{x^2} = \sqrt{-16}$

NO REAL SOLUTIONS

Sec 5-6



Imaginary Numbers:

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

i is called the imaginary unit.

Simplify:

1. $\sqrt{16} = 4$
2. $\sqrt{576} = 24$
3. $\sqrt{96} = \sqrt{16 \cdot 6}$ $\quad 4\sqrt{6}$
4. $\sqrt{7} = \sqrt{7}$

Simplify each

1. $\sqrt{-16} = \sqrt{16 \cdot -1}$

$= 4i$

2. $\sqrt{-576} = 24i$

3. $\sqrt{-96} = \sqrt{16 \cdot 6}$

$= 4i\sqrt{6}$

4. $\sqrt{-7} = i\sqrt{7}$

Complex Numbers:

any number that can be written in the form: $a + bi$ (a and b can be any real #)

Standard Form of a Complex Number

Real Part

Imaginary Part

Real Number: when $b=0$

Imaginary Number: when $b \neq 0$ (a may or may not be zero)