Name Key Math 1005 sec 2 Spring 2008

Participation 7 – sec 1.5

1. Solve by factoring $4x^2 - 13x = -3$

$$4x^2 - 13x + 3 = 0$$
$$(4x-1)(x-3) = 0$$
$$4x - 1 = 0 \quad \text{or} \quad x - 3 = 0$$
$$+1 \quad +1 \qquad\qquad +3 \quad +3$$
$$\frac{4x}{4} = \frac{1}{4} \rightarrow \boxed{x = \frac{1}{4} \quad \text{OR} \quad x = 3}$$

2. Solve using the square root property $(x-1)^2 = -9$

$$\sqrt{(x-1)^2} = \pm\sqrt{-9}$$
$$x - 1 = \pm 3i$$
$$+1 \qquad +1$$
$$\boxed{x = 1 \pm 3i}$$

3. Solve by completing the square

a) $x^2 + 6x = -8$

$$\frac{b}{2} = \frac{6}{2}$$
$$x^2 + 6x + \left(\frac{6}{2}\right)^2 = -8 + \left(\frac{6}{2}\right)^2$$
$$x^2 + 6x + (3)^2 = -8 + 9$$
$$(x+3)^2 = 1$$

$$\sqrt{(x+3)^2} = \pm\sqrt{1}$$
$$x + 3 = \pm 1$$
$$x + 3 = 1 \quad \text{or} \quad x + 3 = -1$$
$$-3 \quad -3 \qquad\qquad -3 \quad -3$$
$$\boxed{x = -2} \quad \text{OR} \quad \boxed{x = -4}$$

b) $3x^2 - 2x - 1 = 0$

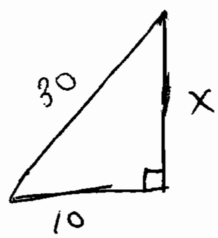
$$\frac{3x^2}{3} - \frac{2x}{3} = \frac{1}{3}$$
$$x^2 - \frac{2}{3}x = \frac{1}{3}$$
$$-\frac{b}{2} = \frac{-\frac{2}{3}}{2} = -\frac{2}{3} \cdot \frac{1}{2} = \frac{-1}{3}$$
$$x^2 - \frac{2}{3}x + \left(\frac{-1}{3}\right)^2 = \frac{1}{3} + \frac{1}{9}$$
$$\left(x - \frac{1}{3}\right)^2 = \frac{4}{9}$$

$$\sqrt{\left(x - \frac{1}{3}\right)^2} = \pm\sqrt{\frac{4}{9}}$$
$$x - \frac{1}{3} = \pm\frac{2}{3}$$
$$x - \frac{1}{3} = \frac{2}{3} \quad \text{OR} \quad x - \frac{1}{3} = -\frac{2}{3}$$
$$+\frac{1}{3} \quad +\frac{1}{3} \qquad\qquad +\frac{1}{3} \quad +\frac{1}{3}$$
$$\boxed{x = 1} \quad \text{or} \quad \boxed{x = \frac{-1}{3}}$$

4. Solve using the quadratic formula $x^2 - 2x + 17 = 0$

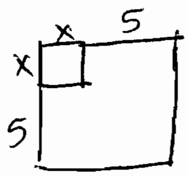
$$a = 1, \; b = -2, \; c = 17$$
$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(17)}}{2(1)}$$
$$= \frac{2 \pm \sqrt{4 - 68}}{2} = \frac{2 \pm \sqrt{-64}}{2} = \frac{2 \pm 8i}{2} = \frac{2(1 \pm 4i)}{2}$$
$$= \boxed{1 \pm 4i}$$

5. The base of a 30-foot ladder is 10 feet from a building. If the ladder reaches the flat roof, how tall is the building? x = height of building



$$x^2 + 10^2 = 30^2$$
$$x^2 + 100 = 900$$
$$x^2 = 800$$
$$x = \pm\sqrt{800}$$ ⇒ only use pos value
$$x = \sqrt{800} \approx \boxed{28.28\text{ ft}}$$

6. Each side of a square is lengthened by 5 inches. The new larger square has an area of 36 inches squared. Find the side length of the original square. x = side length of orig. square



$$(x+5)^2 = 36$$
$$x+5 = \pm\sqrt{36}$$
$$x+5 = \pm 6$$

$x+5 = 6$ or $x+5=-6$

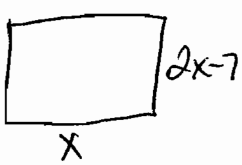
$-5\ \ -5 \qquad -5\ \ -5$

$\boxed{x = 1\text{ in}}$ $\qquad x = \cancel{-11}$ doesn't make sense

7. An architect is allowed 15 square yards of floor space to add a small bedroom to a house. Because of the room's design in relationship to the existing structure, the width of the rectangular floor must be 7 yards less than two times the length. Find the length and width of the rectangular floor that the architect is permitted. x = Length

$2x-7$ = width

Area = 15



$$x(2x-7) = 15$$
$$2x^2 - 7x = 15$$
$$2x^2 - 7x - 15 = 0$$
$$(2x+3)(x-5) = 0$$

$2x+3=0$ or $x-5=0$

$-3\ \ -3 \qquad +5\ \ +5$

$\frac{2x}{2} = \frac{-3}{2} \qquad x = 5$

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

$\boxed{\text{Length 5 yds} \quad \text{width 3 yds}}$

$2(5)-7=3$