11/6/12 - Sec 9.3 Math 1010

48

51

54

~~9.1~~

~~#48~~

$$2x^2 + 8x = 9$$

1st Divide everything by 2

~~9.2~~

~~#48~~

$$-x = \sqrt{\frac{3x+7}{4}}$$

9.2

48

$$4x^2 - 28x + 49 = 0$$

$a = 4 \quad b = -28 \quad c = 49$

$$x = \frac{28 \pm \sqrt{(-28)^2 - 4(4)(49)}}{2(4)}$$

$$= \frac{28 \pm \sqrt{784 - 784}}{8}$$

$$= \frac{28 \pm \sqrt{0}}{8}$$

$$\frac{28}{8} = \frac{7}{2}$$

$$\boxed{x = \frac{7}{2}}$$

#51

a) $3x^2 + 13x = -12$

$+12 \quad +12$

$3x^2 + 13x + 12 = 0$

$a = 3 \quad b = 13 \quad c = 12$

Discriminant: $b^2 - 4ac$

$(13)^2 - 4(3)(12)$

$169 - 144$

25

2 Rational #'s

Yes → solve by factoring

$3x^2 + 13x + 12 = 0$

$(x + 3)(3x + 4) = 0$

36	13
~~3, 12~~	~~15~~
9, 4	13 ✓

$x + 3 = 0 \quad 3x + 4 = 0$

$-3 \quad -3 \quad -4 \quad -4$

$3x = -4$

$\frac{3}{3} \quad \frac{3}{3}$

$x = -3 \quad x = -4/3$

$\frac{9}{3} \quad \frac{4}{3}$

$3, \ 4/3$

51 b) $2x^2 + 19 = 14x$

Discriminant: 44 ✓

2 irrationals

$\frac{7 \pm \sqrt{11}}{2}$ ✓

#54

$$r^2 - br + 49 = 0$$

$a=1 \quad b=-b \quad c=49$

Discriminant: $b^2 - 4ac$

$$(-b)^2 - 4(1)(49) = 0$$

$$b^2 - 196 = 0$$

$$+196 \quad +196$$

$$\sqrt{b^2} = \sqrt{196}$$

$$\boxed{b = \pm 14}$$

Sec 9.3 Equations Quadratic in Form

How to Solve Quadratic Equations

1. Factoring (Easiest <u>if</u> it works)
2. Completing the Square (works everytime)
3. Quadratic Formula (works everytime)

Ex: a Rational Eq

$$\frac{1}{x} + \frac{1}{x-1} = \frac{7}{12}$$

LCD: $12x(x-1)$

D: $x \neq 1, 0$

$$\frac{1}{x} + \frac{1}{x-1} = \frac{7}{12} \quad \cdot 12x(x-1)$$

$$12(x-1) + 12x = 7x(x-1)$$

$$12x - 12 + 12x = 7x^2 - 7x$$

$$24x - 12 = 7x^2 - 7x$$
$$-24x + 12 \qquad -24x + 12$$

$$0 = 7x^2 - 31x + 12$$

$$a = 7 \quad b = -31 \quad c = 12$$

$$x = \frac{31 \pm \sqrt{(-31)^2 - 4(7)(12)}}{2(7)}$$

$$= \frac{31 \pm \sqrt{961 - 336}}{14}$$

$$= \frac{31 \pm \sqrt{625}}{14}$$

$$= \frac{31 \pm 25}{14}$$

$$= \frac{31+25}{14} = \frac{56}{14}, \quad \frac{31-25}{14} = \frac{6}{14}$$

$$\boxed{x = 4, \ 3/7}$$

18 mph in still water

9/10 hr to go 8mi Upstream & 8mi down

Rate of current = ? x

	Rate	time	distance
upstream	$18-x$	$\frac{8}{18-x}$	8
downstream	$18+x$	$\frac{8}{18+x}$	8

$\frac{d}{r} = \frac{r \cdot t}{r}$

$\frac{d}{r} = t$

$\frac{8}{18-x} + \frac{8}{18+x} = \frac{9}{10}$ (9/10 hr)

LCD: $10(18-x)(18+x)$

D: $x \neq 18$ or -18

$10(18-x)(18+x)\frac{8}{18-x} + 10(18-x)(18+x)\frac{8}{18+x} = \frac{9}{10}\cdot 10(18-x)(18+x)$

$8 \cdot 10(18+x) + 8 \cdot 10(18-x) = 9(18-x)(18+x)$

$1440 + 80x + 1440 - 80x = 9(324 - x^2)$

$2880 = 2916 - 9x^2$

$-2916 \quad -2916$

$\frac{-36}{-9} = \frac{-9x^2}{-9}$

$\pm\sqrt{4} = \sqrt{x^2}$

$x = \pm 2$

2 mph

Work Problems

$$\frac{1}{\text{time alone}}\left(\text{time together}\right) + \frac{1}{\text{time alone}}\left(\text{time together}\right) = 1 \text{ job well done}$$

#32 New worker: x ← 2 hrs Longer

old worker: $x-2$

time together: 5

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

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

LCD: $x(x-2)$

D: $x \neq 0, 2$

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

$$5x - 10 + 5x = x^2 - 2x$$

$$10x - 10 = x^2 - 2x$$

$$-10x \quad +10 \qquad -10x \quad +10$$

$$0 = x^2 - 12x + 10$$

$a = 1 \quad b = -12 \quad c = 10$

$$x = \frac{12 \pm \sqrt{(-12)^2 - 4(1)(10)}}{2(1)}$$

$$\frac{12 \pm \sqrt{144 - 40}}{2}$$

$$\frac{12 \pm \sqrt{104}}{2}$$

$$\frac{12+\sqrt{104}}{2}, \frac{12-\sqrt{104}}{2}$$

11.1, ~~0.900~~

11.1 hrs