

MATH 4E Fall 2012
Quiz 1 Solutions

1.

$$\frac{x}{a} + \frac{x}{b} = c$$

$$\left(\frac{x}{a} + \frac{x}{b}\right)(ab) = c(ab)$$

$$\frac{xab}{a} + \frac{xab}{b} = abc$$

$$xb + xa = abc$$

$$(a + b)x = abc$$

$$x = \frac{abc}{a + b}$$

2.

$$\sqrt{3x + 7} + \sqrt{x + 2} = 1$$

$$\sqrt{3x + 7} = 1 - \sqrt{x + 2}$$

$$3x + 7 = 1 - 2\sqrt{x + 2} + x + 2$$

$$2x + 4 = -2\sqrt{x + 2}$$

$$4x^2 + 16x + 16 = 4(x + 2)$$

$$x^2 + 4x + 4 = x + 2$$

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

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

$$x = -1, -2$$

Check $x = -1$:

$$\sqrt{3(-1) + 7} + \sqrt{-1 + 2} = \sqrt{4} + \sqrt{1} = 2 + 1 = 3 \neq 1$$

Check $x = -2$:

$$\sqrt{3(-2) + 7} + \sqrt{-2 + 2} = \sqrt{1} + \sqrt{0} = 1$$

Therefore, our solution set is $\{-2\}$.

3.

$$x^4 + 13x^2 + 36 = 0$$

Let $u = x^2$. Then

$$u^2 + 13u + 36 = 0$$

$$(u + 4)(u + 9) = 0$$

$$u + 9 = 0$$

$$u + 4 = 0$$

$$x^2 + 9 = 0$$

$$x^2 + 4 = 0$$

$$x^2 = -9$$

$$x^2 = -4$$

$$x = \pm 3i$$

$$x = \pm 2i$$

Therefore, our solution set is $\{\pm 2i, \pm 3i\}$.