MATH 111:
HOMEWORK 02

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B.3

5. *Consider the expression*

$$\frac{1}{x} - \frac{2}{x+1} - \frac{x}{(x+1)^2}.$$

(a) How many terms does this expression have?

(b) Find the least common denominator of all the terms.

(c) Perform the addition and simplify.

17. *Simplify the rational expression*

$$\frac{x^2 + 6x + 8}{x^2 + 5x + 4}.$$

21. *Perform the multiplication*

$$\frac{4x}{x^2 - 4} \cdot \frac{x+2}{16x}.$$

33. *Perform the addition*

$$\frac{1}{x+5} + \frac{2}{x-3}.$$

43. *Rationalize the denominator*

$$\frac{2}{\sqrt{2} + \sqrt{7}}.$$

50. *Find the quotient and remainder using long division*

$$\frac{x^3 + 3x^2 + 4x + 3}{3x + 6}.$$

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C.1

9. *Solve the equation*

$$x - 3 = 2x + 6.$$

13. *Solve the equation*

$$2(1 - x) = 3(1 + 2x) + 5.$$

23. *Solve the equation*

$$\frac{2}{t} = \frac{3}{5}.$$

27. *Solve the equation*

$$\frac{2}{t + 6} = \frac{3}{t - 1}.$$

35. *Find all real solutions of the equation*

$$y^2 - 24 = 0.$$

41. *Find all real solutions of the equation*

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

61. *Solve the following equation for x*

$$xy = 3y - 2x$$

C.2

7. *Solve the following equation by factoring*

$$3x^2 - 5x - 2 = 0.$$

11. *Complete the square for the given expression:*

$$x^2 + 7x + \square = (x + \square)^2.$$

23. *Solve the following equation by factoring or using the Quadratic Formula*

$$x^2 - 2x - 15 = 0.$$

27. *Solve the following equation by factoring or using the Quadratic Formula*

$$x^2 + 3x + 1 = 0.$$

C.3

1. *Fill in the blank with an appropriate inequality sign.*

(a) If $x < 5$, then $x - 3$ ___ 2.
(b) If $x \leq 5$, then $3x$ ___ 15.
(c) If $x \geq 2$, then $-3x$ ___ -6.
(d) If $x < -2$, then $-x$ ___ 2.

10. *Let $S = \{-2, -1, 0, \frac{1}{2}, 1, \sqrt{2}, 2, 4\}$. Determine which elements of S satisfy the inequality*

$$x^2 + 2 < 4.$$

15. *Solve the linear inequality*
$$7 - x \geq 5.$$
Express the solution using interval notation, and graph the solution set.

17. *Solve the linear inequality*
$$3x + 11 \leq 7x + 8.$$
Express the solution using interval notation, and graph the solution set.

23. *Solve the non-linear inequality*
$$(x + 2)(x - 3) < 0.$$
Express the solution using interval notation, and graph the solution set.

25. *Solve the non-linear inequality*
$$x^2 - 3x - 18 \leq 0.$$
Express the solution using interval notation, and graph the solution set.