Math 1220
Unit P: *Prerequisite Algebra and Equations Review*
Sections 1.2, 1.4-1.6, 1.7, 2.1-2.5, 3.4-3.6, 4.1-4.3, 4.5- 4.6

> **Note:** Not all material is covered in these LNs. You must also look at the *Prerequisite Tutorials* and the **ALEKS** Prerequisite Reviews.

Exponents & Radicals

1. Simplify (a) $x^2 x^3 =$ _____ (b) $(x^2)^3 =$ _____ (c) $\left(\frac{2}{3}\right)^3 =$ _____ (d) $\left(\frac{2}{3}\right)^{-3} =$ _____ (e) $-27^{\frac{2}{3}} =$ _____

2. ***T or F?*** If false, replace the right-hand side of the expression with the correct answer.

(a) _____ $3x^{-1} = \frac{1}{3x}$ (b) _____ $\frac{3x^{-1}}{x^2} = \frac{3}{x^3}$ (c) _____ $\frac{x^{-1}+5}{x} = \frac{5}{x^2}$

3. ***T or F?*** If false, replace the right-hand side of the expression with the correct answer.

(a) _____ $(x+y)^2 = x^2 + y^2$ (b) _____ For $x, y > 0$, $\sqrt{x^2+y^2} = x+y$ (c) _____ For $x, y > 0$, $\sqrt{x^2 y^2} = xy$

> **Practice:** *Prerequisite Tutorial 1* (**PT1**), **ALEKS** Prereq Review 1 (**ALEKS** PR1)

1.6-1.7: Linear Equations & Inequalities

4. ***T or F?*** If false, give the correct answer.

(a) _____ If $-\frac{1}{6}x > 5$, then $x > -30$ (b) _____ $5 \geq x > -1$ can be written using interval notation as $[5, -1)$ (c) _____ Using set notation, the solution $x = 5$ is written as $x = \{5\}$

5. To solve $\frac{1}{6}x - 3 < \frac{5}{4}x$, what is the best 1st move?
(a) M! both sides by 6
(b) M! both sides by 12
(c) M! both sides by 24
(d) Divide both sides by x

> **Practice: ALEKS** PR2

1.6-1.7: Absolute Value Equations and Inequalities

$|x|$ means "distance that x lies from zero" on the real number line

6. Translate each mathematical statement into a "meaningful" English statement. Draw a picture, then solve for x.

(a) $|x| = 2$ 　　　　　　　　　　　(b) $|x| < 3$ 　　　　　　　　　　(c) $|x| > 4$

7. Consider $y < -3 \ \ or \ \ y > 3$. Draw a graph that represents this statement, then write it as an absolute value statement.

8. To solve $2|x - 4| + 1 = 7$, what are the steps?

Step 1: 　　　　　　　　　　　　　　　　Step 2:

9. To solve each inequality, what are the steps? *Write solutions using interval notation*.

(a) $2|x - 4| + 1 < 7$ 　　　　　　　　　(b) $2|x - 4| + 1 > 7$

Step 1: 　　　　　　　　　　　　　　　　Step 1:

Step 2: 　　　　　　　　　　　　　　　　Step 2:

Step 3: 　　　　　　　　　　　　　　　　Step 3:

10. What's the solution? There is NO need to do calculations – just *THINK ABOUT IT!*

　　　　(a) $|x + 2| = -3$ 　　　　　(b) $|x + 2| \geq 0$ 　　　　　　(c) $|x + 2| < -4$

Practice: **PT4, ALEKS** PR3

2.3-2.5: Factoring

11. Factor (a) $2x^2 + 5x - 12$ (b) $12x^2 - 5x - 2$

(d) $12x^2 - 6x^3$ (e) $12x^2(x + 2)^2 - 4x^3(x + 2)$

(f) $12x^{-2} - 6x^{-3}$ (g) $12x^2(x + 2)^{3/2} - 4x^3(x + 2)^{1/2}$

Practice: **PT2**, **ALEKS** PR4

More practice – Text Exercises: 2.3 #11, 15, 23, 27, 71, 75; **2.4** #13, 17, 23, 35, 41; **2.5** #13, 19, 21

12. To solve $(x - 3)(2x - 1) = 18$

      (a) set each factor equal to 18
      (b) set each factor equal to 0
      (c) FOIL out the left side
      (d) none of the above

13. To solve $8x^2 = 3x$

      (a) divide both sides by 8
      (b) divide both sides by x
      (c) square root both sides
      (d) none of the above

12. $(x - 3)(2x - 1) = 18$

13. $8x^2 = 3x$

Can we? Should we? YES or NO?

14. (a) To solve $(x + 7)^2 = 8$:

(1) can we FOIL out the left side? _____

(2) should we FOIL out the left side? _____

Solve (b) $2(x + 7)^2 = 16$ (c) $2v^2 + 34 = 0$

Can we? Should we?   *YES or NO?*

15. To solve $p^2 + (p + 2)^2 = 100$,   (1) can we square root each term? _____

                                   (2) should we square root both sides? _____

Solve $p^2 + (p + 2)^2 = 100$

Quadratic Formula

If $ax^2 + bx + c = 0$, then $\quad x =$

16. **Solve** $3x^2 - 2x - 7 = 0$

17. Solve (a) $2w^3 - 8w^2 - 24w = 0$ (b) $2x^3 = 32x$

(c) $64x^2 - 4x^4 = 0$ (d) $x^{\frac{2}{3}} = 64$

Practice: **PT4**, ALEKS PR5

More Practice – Text Exercises: 1.2 #23, 41, 47, 49; **3.4** #13, 19, 25, 31, 41, 45, 51, 53; **3.5** #19; **3.6** #11, 13

4.1-4.2: Rational Expressions

18. Simplify (a) $\dfrac{3(x-1)^2+x(x-1)}{x^2-1}$

(b) $\dfrac{x-1}{x^2+x-12}\cdot\dfrac{x+4}{x^2-x}$

(c) $\dfrac{\frac{1}{x}-\frac{1}{3}}{1-\frac{1}{3x}}$

(d) $\dfrac{\frac{2}{x+1}-2}{x}$

19. Combine and simplify: $\dfrac{x-1}{x^2-x-2}+\dfrac{4}{x^2+x}$

Practice: **PT3**, **ALEKS** PR6

More practice – Text Exercises: **4.1** #39, 41, 49, 53, 71, 81, 91, 117; **4.2** #17, 27, 35, 37, 39, 51, 55, 63, 67, 71

4.3: Rational Equations

What restrictions are on the variable?

20. Solve (a) $\dfrac{2}{3x} + \dfrac{1}{4} = \dfrac{11}{6x} - \dfrac{1}{3}$ restrictions:

Step 1: M! both sides by LCD = _____

$$\frac{2}{3x} + \frac{1}{4} = \frac{11}{6x} - \frac{1}{3}$$

(b) $\dfrac{36}{p^2-9} = \dfrac{2p}{p+3} - 1$ restrictions:

Step 1: FACTOR denominators and find LCD.

$$\frac{36}{(p-3)(p+3)} = \frac{2p}{p+3} - 1$$

Step 2: M! both sides by LCD = _____

$$\frac{36}{(p-3)(p+3)} = \frac{2p}{p+3} - 1$$

(c) $\dfrac{-8}{t^2-6t} + \dfrac{t}{t-6} = \dfrac{1}{t}$

Step 1: Factor all denominators
Step 2: Multiply both sides by LCD

Practice: **PT4**, **ALEKS** PR7

More practice – Text Exercises: **4.3** #13, 15, 19, 23, 27, 29, 35, 39

1.2: Solving for a Variable

21. Solve for *m*: $\frac{3}{k} + \frac{1}{m} = x$

Step 1: Multiply by LCD: $\qquad \frac{3}{k} + \frac{1}{m} = x$

Step 2: Isolate *m* terms

Step 3: Factor out *m* and finish

4.6: Radical Equations

22. **T or F?** _____To solve $\sqrt{x-1} - \sqrt{3x+1} = -2$, we can square each term to get $(x-1) - (3x-1) = 4$

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

Practice: **PT4**, **ALEKS** PR8

More practice – **Text Exercises: 1.2** #77, 79; **4.6** #19, 23, 49