

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) $x^2x^3 = x^5$ (b) $(x^2)^3 = x^6$ (c) $\left(\frac{2}{3}\right)^3 = \frac{8}{27}$ (d) $\left(\frac{2}{3}\right)^{-3} = \frac{27}{8}$ (e) $-27^{\frac{2}{3}} = -9$
- $= \left(\frac{3}{2}\right)^3 = \frac{27}{8}$
 $= -\left(27^{\frac{2}{3}}\right)$
 $= -\left((27^{\frac{1}{3}})^2\right)$
 $= -\left(3^2\right) = -9$
2. **T or F?** If false, replace the right-hand side of the expression with the correct answer.

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

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

- (a) F $(x+y)^2 = x^2 + y^2$ (b) F For $x, y > 0$, $\sqrt{x^2 + y^2} = x + y$ *does not S!* (c) T For $x, y > 0$, $\sqrt{x^2y^2} = xy$
- $(x+y)(x+y) = x^2 + 2xy + y^2$
 $x^2 + xy + xy + y^2$
 $(xy)^2 = x^2y^2$

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

1.6-1.7: Linear Equations & Inequalities

4. 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

Multiply

$$12 \left(\frac{1}{6}x - 3 \right) < \left(\frac{5}{4}x \right) \cdot 12$$

$$2x - 36 < 15x$$

$$-13x < 36$$

$$x > \frac{-36}{13}$$

If you multiply or divide both sides of an inequality by a negative, you must switch the direction of the inequality symbol.

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

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

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) $|x| = 2$

Distance that x lies from 0 is 2



$x = -2, 2$

(b) $|x| < 3$

Distance x lies from 0 is less than 3



$-3 < x < 3$

(c) $|x| > 4$

Distance that x lies from 0 is more than 4



$x < -4$ or $x > 4$

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



$|y| > 3$

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

Step 1: ISOLATE abs. val.

$2|x - 4| = 6$
 $|x - 4| = 3$

Step 2: LOSE abs. val. appropriately

$x - 4 = -3$ or $x - 4 = 3$
 $x = 1$ $x = 7$

The quantity inside the absolute value lies 3 units from 0, so equals 3 or -3.

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: ISOLATE abs. val.

$2|x - 4| < 6$
 $|x - 4| < 3$

Step 1: ISOLATE

$|x - 4| > 3$

Step 2: Quantity inside absolute value lies less than 3 units from zero, so between -3 and 3.

Step 2: Quantity inside the absolute value is more than 3 units from 0, so to the left of -3 and to the right of +3

Step 3:

$-3 < x - 4 < 3$
 $+4 \quad +4 \quad +4$
 $1 < x < 7$

Step 3:

$x - 4 < -3$ or $x - 4 > 3$
 $x < 1$ or $x > 7$

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) $|x + 2| < -4$

\emptyset
 b/c abs val \neq neg.

all x
 b/c abs value is ALWAYS ≥ 0

no sol'n or \emptyset

Practice: PT4, ALEKS PR3

