

Final Exam Review #3

ANSWER KEY

Expressions

Equations

Inequalities

Practice Problem Set:

Expressions

1. Consider the expression: $3x - 1$.

- How many **terms** does the expression have? **2**
- What is the **coefficient** of the variable term? **3**
- Identify the **constant** term. **-1**

2. Write an **algebraic expression** for each verbal phrase.

- Seven less than a number **m**. **$m - 7$**
- The sum of twice a number **p** and three. **$2p + 3$**
- Twice the sum of a number **p** and three. **$2(p + 3)$**
- A number **x** subtracted from fifteen. **$15 - x$**
- Six less than a number **q**. **$q - 6$**
- The cost of **a** apples if each apple cost \$0.79. **$0.79a$**

3. The perimeter of a square is represented by $36x - 12$. Represent one side-length of the square.

*A square has 4 congruent sides.
The perimeter is the sum of all sides.
To find one side-length, divide by 4.*

Example:

Perimeter = 12 units

Side-length = 3 units because

$$(36x - 12) \div 4$$

$$\frac{36x - 12}{4}$$

$$\frac{36x}{4} + \frac{-12}{4}$$

$$\boxed{9x - 3 \text{ units}}$$

Check

$$(9x - 3) + (9x - 3) + (9x - 3) + (9x - 3)$$

$$9x + 9x + 9x + 9x - 3 - 3 - 3 - 3$$

$$36x - 12$$

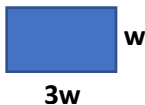
or

$$4(9x - 3)$$

$$36x - 12$$

4. The width of a rectangle is represented by w . The length of the rectangle is 3 times the width. Which expression below represents the **area** of the rectangle?

Draw a picture



$$A = lw$$

$$A = (3w)(w)$$

A. $w + 3w$

B. $2(w) + 2(3w)$

C. $w(3w)$

D. $w^2 + (3w)^2$

5. Gary went to a carnival over the weekend. He paid an admission fee to enter the carnival and spent additional money to go on x number of rides. He did not spend any money on food, drinks or games. The expression $0.75x + 10$ can be used to calculate the total amount of money Gary spent at the carnival.

- a. What does the number **10** represent in the expression?

The constant **10** represents the admission fee to enter the carnival.

- b. What does the coefficient **0.75** represent in the expression?

The coefficient **0.75** represents the cost per ride. Each ride at the carnival costs 75 cents.

6. Consider the rectangle pictured below. Express the **area** and **perimeter** as an algebraic expression in simplest form.

AREA

$$A = lw$$

$$A = 4x(9 - x)$$

$$A = 36x - 4x^2$$

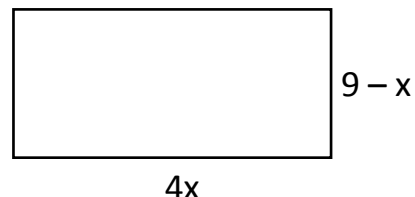
Area: $-4x^2 + 36x \text{ units}^2$

PERIMETER

$$(9 - x) + (9 - x) + 4x + 4x$$

$$-x - x + 4x + 4x + 9 + 9$$

Perimeter: $6x + 18 \text{ units}$



or

$$2(9 - x) + 2(4x)$$

$$18 - 2x + 8x$$

$$18 - 2x + 8x$$

$6x + 18 \text{ units}$

Equations

Solve for x in each equation below.

$$7. -\frac{1}{3}(12x + 2) = \frac{5}{6}$$

$$\begin{array}{r} -4x - \frac{2}{3} = \frac{5}{6} \\ +\frac{2}{3} \quad +\frac{2}{3} \\ \hline -4x = 1\frac{1}{2} \\ -4x = \frac{1.5}{-4} \end{array}$$

$$\boxed{x = -0.375 \text{ or } -\frac{3}{8}}$$

*Don't forget that all equations can be checked!
Does your solution make the statement true?*

$$\begin{array}{l} -\frac{1}{3}(12x + 2) = \frac{5}{6} \\ -\frac{1}{3}(12(-0.375) + 2) = \frac{5}{6} \\ -\frac{1}{3}(-4.5 + 2) = \frac{5}{6} \\ -\frac{1}{3}(-2.5) = \frac{5}{6} \end{array}$$

$$\begin{array}{l} 0.8\bar{3} = \frac{5}{6} \\ 0.8\bar{3} = 0.8\bar{3} \quad \text{It checks!} \end{array}$$

$$8. 5x + 12 = 3x - 10 \quad \text{Check}$$

$$\begin{array}{r} 2x + 12 = -10 \\ \underline{-12 \quad -12} \\ 2x = -22 \\ \underline{2 \quad 2} \\ \boxed{x = -11} \end{array}$$

$$\begin{array}{l} 5x + 12 = 3x - 10 \\ 5(-11) + 12 = 3(-11) - 10 \\ -55 + 12 = -33 - 10 \\ -43 = -43 \quad \text{It checks!} \end{array}$$

$$9. 2(x - 1) = 8(x + 5) \quad \text{Check}$$

$$\begin{array}{r} 2x - 2 = 8x + 40 \\ -8x \quad -8x \\ \hline -6x - 2 = 40 \\ \underline{+2 \quad +2} \\ -6x = 42 \\ \underline{-6 \quad -6} \\ \boxed{x = -7} \end{array}$$

$$\begin{array}{l} 2(x - 1) = 8(x + 5) \\ 2(-7 - 1) = 8(-7 + 5) \\ 2(-8) = 8(-2) \\ -16 = -16 \quad \text{It checks!} \end{array}$$

$$10. 4(x - 5) = 6 - 2(x + 7) \quad \text{Check}$$

$$\begin{array}{r} 4x - 20 = 6 - 2x - 14 \\ 4x - 20 = -2x - 8 \\ \underline{+2x \quad +2x} \\ 6x - 20 = -8 \\ \underline{+20 \quad +20} \\ 6x = 12 \\ \underline{6 \quad 6} \\ \boxed{x = 2} \end{array}$$

$$\begin{array}{l} 4(x - 5) = 6 - 2(x + 7) \\ 4(2 - 5) = 6 - 2(2 + 7) \\ 8 - 20 = 6 - 2(9) \\ -12 = 6 - 18 \\ -12 = -12 \quad \text{It checks!} \end{array}$$

11. While in the park, Fred decided to rent a bike for a few hours. He had to pay an initial fee of \$20 in addition to \$5 per hour. If Fred paid \$40, how many hours did he rent the bike? Write and solve an equation to answer the question. Define your variable.

x: the number of hours the bike is rented

$$\begin{array}{r} 20 + 5x = 40 \\ -20 \quad -20 \\ \hline 5x = 20 \\ \underline{5 \quad 5} \\ x = 4 \end{array}$$

Check

- Initial fee: \$20
- Rented bike for 4 hrs and paid \$5/hr = \$20
- Spent \$40 and \$20 + \$20 = \$40

Fred can rent the bike for 4 hours.

12. Veronica bought 3 boxes of graham crackers for \$4.99 each and 2 jars of apple sauce for d dollars each. The charge before tax was \$20.47. Which equation below can be used to find the cost of one jar of apple sauce?

A. $4.99 + 5d = 20.47$

B. $4.99 + 2d = 20.47$

C. $14.97 + 2d = 20.47$

D. $9.98 + 3d = 20.47$

$3 \text{ boxes} \times \$4.99 = \14.97

$2 \text{ jars} \times d \text{ dollars} = 2d$

$\text{Total} = \$14.97 + 2d$

Inequalities



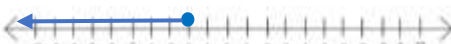
13. Using the given variable, write an **inequality** statement that represents the situation.

a. Sally is at least 12 years old. Let s represent Sally's age. $s \geq 12$

b. The maximum weight, w , for a suitcase is 50 pounds. $w \leq 50$

c. Ticket prices, p , for the concert start at \$60. $p \geq 60$

14. Solve each inequality and graph the solution set on the number line provided.

$3(x - 5) > 36$ $3x - 15 > 36$ $\begin{array}{r} +15 \quad +15 \\ \hline 3x > 51 \\ \hline 3 \quad 3 \\ \hline x > 17 \end{array}$ 	$4(x - 9) < 5(x + 1)$ $4x - 36 < 5x + 5$ $\begin{array}{r} -5x \quad -5x \\ \hline -1x - 36 < 5 \\ \hline +36 \quad +36 \\ \hline -1x < 41 \\ \hline -1 \quad -1 \\ \hline x > -41 \end{array}$ <p><i>Flip the inequality symbol. Both sides of the inequality were divided by -1.</i></p> 	$-\frac{1}{4}(8x - 24) \geq 10$ $-2x + 6 \geq 10$ $\begin{array}{r} -6 \quad -6 \\ \hline -2x \geq 4 \\ \hline -2 \quad -2 \\ \hline x \leq -2 \end{array}$ <p><i>Flip the inequality symbol. Both sides of the inequality were divided by -2.</i></p> 
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15. The chess club has \$300 to spend at the Long Island Chess Competition. The club has to pay \$25 for bus transportation and a fee of \$15 for each match they compete in.

a. Write an **inequality** that can be used to determine the maximum number of matches, x , the club can compete in.

$$25 + 15x \leq 300$$

b. Solve your inequality from part (a).

$$25 + 15x \leq 300$$

$$\begin{array}{r} -25 \quad -25 \\ \hline 15x \leq 275 \\ \hline 15 \quad 15 \\ \hline x \leq 18.33333... \text{ or } x \leq 18.\bar{3} \end{array}$$

c. How many matches can the club compete in?

The club can compete in 18 matches.

Check

- 18 matches \times \$15 = \$270
- \$25 for transportation
- \$25 + \$270 = \$295

The club is within their budget. Another match would put the club over \$300.