6-6-19

Aim: SWBAT review for the final exam.

HW: Final Exam Wednesday June 19th

Do Now: Pencil and calculator

(x + 6) (x + 6)

39) $(x + 6)^2$

$x^2 + 6x + 6x + 36$

$x^2 + 12x + 36$

(x - 6) (x - 6)

40) $(x - 6)^2$

$x^2 - 6x - 6x + 36$

$x^2 - 12x + 36$

41) $(x + 3)(x^2 + 4x + 2)$

$x^3 + 4x^2 + 2x + 3x^2 + 12x + 6$

$x^3 + 7x^2 + 14x + 6$

42) $\frac{12x^2 + 4x}{4x}$

$3x + 1$

43) $\frac{15a^3 + 3a^2b - 6ab}{3a}$

$5a^2 + ab - 2b$

44) $\frac{4xyz + 12xyz^2 - 6xy^2}{2xy}$

$2z + 6z^2 - 3y$

$6z^2 - 3y + 2z$

45) $\frac{8uv + 10uv^2w - 8uvw}{2uv}$

$4 + 5vw - 4w$

$5vw - 4w + 4$

46) $\frac{x^4y - 2x^3y - x^3y^3z}{x^2y}$

$x^2 - 2x - xy^2z$

$-xy^2z + x^2 - 2x$

Factoring

The first step to factoring is ALWAYS to look for a GCF!

Factoring an expression by finding the GCF is reversing the Distributive Property.

To factor out a GCF:

1) Find the GCF of ALL terms in the expression.
2) Divide each term of the expression by the GCF.
3) Rewrite the expression as the product of the GCF and the remaining factors.

smallest # or smaller than it.

Find the Greatest Common Factor (GCF) of each pair of terms.

47) 25x and 30y — GCF: 5

48) 3x and 21xy — GCF: 3x

49) 4y and 16 — GCF: 4

50) 12y and 28xy — GCF: 4y

Factor each expression (using the GCF)

51) $x - xy$ — $x(1 - y)$

52) $-15m + 50$ — $5(-3m + 10)$

53) $18n + 24$ — $6(3n + 4)$

54) $21xy - 28y$ — $7y(3x - 4)$

55) $4x^4 - 22x^2 + 18x$

$2x(2x^3 - 11x + 9)$

56) $21x^5 + 35x^3 + 49x^2$

$7x^2(3x^3 + 5x + 7)$

57) $2c^5d^4 - 3c^4 + 4c^3$

$c^3(2c^2d^4 - 3c + 4)$

58) $23y^{10} - 46y^7 + 68y^2 + 10y$

$y(23y^9 - 46y^6 + 68y + 10)$

To find the factors of a trinomial we REVERSE the multiplication process. We look for factors of the constant term that have a SUM of the coefficient of the linear term.

1·40
2·20

59) $x^2 + 14x + 40$

Same Signs - both positive

mult. to 40, add to 14

$(x + 10)(x + 4)$

60) $x^2 + 5x - 24$

Different Signs

Bigger positive

mult. to -24, add to 5

$(x + 8)(x - 3)$

61) $x^2 - 9x + 20$

Same Signs - both negative

mult. to 20, add to -9

$(x - 5)(x - 4)$

62) $x^2 + 16x + 15$

Same Signs - both positive

mult. to 15, add to 16

$(x + 15)(x + 1)$

63) $x^2 - 9x + 14$

Same Signs

Both negative

mult. to 14, add to -9

$(x - 7)(x - 2)$

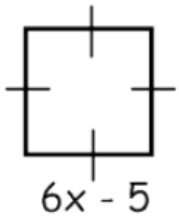
64) $x^2 - 11x + 24$

Same Signs - both negative

mult. to 24, add to -11

$(x - 8)(x - 3)$

65) **Marcus is creating a dog pen for his grandmother. The diagram to the right is his diagram for the project.**



A) Write an expression (in simplest form) to show the amount of fencing it will take to create the pen?

P = add up all sides

$4(6x - 5)$

$24x - 20$

Perimeter = $24x - 20$ units

B) Write an expression (in simplest form) to show the amount space his grandmother's puppy will have to play?

$A = s^2$

$A = (6x - 5)^2$

$A = (6x - 5)(6x - 5)$

$A = 36x^2 - 30x - 30x + 25$

Area = $36x^2 - 60x + 25$ units^2

$(x^2y)^3$ x^6y^3

C) If $x = 2$, find the amount of space (in square feet) that the puppy will have to play.

$36x^2 - 60x + 25$

$36(2)^2 - 60(2) + 25$

$36(2)^2 - 60(2) + 25$

$144 - 120 + 25$

49

The puppy will have 49 square feet of space to play.

Unit 5: Equations

Step 1: SIMPLIFY

Get rid of any parentheses by using the Distributive Property FIRST

THEN, Combine Like-Terms on the same side of the equal sign.
(Same Side Use Same Operation)

Ex. $-5x + 2x + 12 = -10x + 16 + 17$

$-3x + 12 = -10x + 33$

Step 2: Get all variables on one side & constants on the other side.
(Opposite Sides Use Opposite Operations)

Ex. $-3x + 12 = -10x + 33$

$+10x \quad = +10x$

$7x + 12 = 33$

$-12 = -12$

$7x = 21$

Step 4: Solve for the Variable

Ex. $\frac{7x}{7} = \frac{21}{7}$

$x = 3$

** **3-Step Check:**
1) **Rewrite** the equation
2) **Replace** the variable
3) **PROVE** (Do the math!)

Solve the following equations algebraically.

1) $4x - 7 = 2x + 15$

$-2x \quad -2x$

$2x - 7 = 15$

$+7 \quad +7$

$\frac{2x}{2} = \frac{22}{2}$

$x = 11$

2) $11(2c + 8) = -22$

$22c + 88 = -22$

$-88 \quad -88$

$\frac{22c}{22} = \frac{-110}{22}$

$c = -5$

3) $4(-5x + 4) - 2x = -7(2x + 4)$

$-20x + 16 - 2x = -14x - 28$

$-22x + 16 = -14x - 28$

$\frac{-8x}{-8} = \frac{-44}{-8}$

$x = 5.5$

4) $\frac{3}{7}x - 12 = -27$

$+12 \quad +12$

$\frac{7}{3} \cdot \frac{3}{7}x = -15 \cdot \frac{7}{3}$

$x = -35$

5) $\frac{2x-5}{3} = 5$

$3\left(\frac{2x - 5}{3}\right) = 5(3)$

$2x - 5 = 15$

$+5 \quad +5$

$\frac{2x}{2} = \frac{20}{2}$

$x = 10$

6) $\frac{1}{4}(-16x + 32) = \frac{1}{2}(4x - 32)$

$-4x + 8 = 2x - 16$

$-2x \quad -2x$

$-6x + 8 = -16$

$-8 \quad -8$

$\frac{-6x}{-6} = \frac{-24}{-6}$

$x = 4$

7) $3.2x - 7.1 = 6.8 - 1.8x$

$+1.8x \quad +1.8x$

$5x - 7.1 = 6.8$

$+7.1 \quad +7.1$

$\frac{5x}{5} = \frac{13.9}{5}$

$x = 2.78$

8) $0.4(y - 9) = 0.3(y + 4)$

$0.4y - 3.6 = 0.3y + 1.2$

$\frac{0.1y}{0.1} = \frac{4.8}{0.1}$

$y = 48$

9) $\frac{3}{7} = \frac{x-2}{x+2}$

$3(x + 2) = 7(x - 2)$

$3x + 6 = 7x - 14$

$\frac{-4x}{-4} = \frac{-20}{-4}$

$x = 5$

Solve each equation **algebraically** if possible. State whether the equation is an Identity or a Contradiction and explain what that means in terms of the solution.

10) $3x + 7 = 3(x + 2)$

$3x + 7 = 3x + 6$

$-3x \quad -3x$

$7 \neq 6$

Contradiction

No Solution

11) $2x + 9 = 2(x + 4) + 1$

$2x + 9 = 2x + 8 + 1$

$2x + 9 = 2x + 9$

$-2x \quad -2x$

$9 = 9$

Identity

Infinite Solutions

Solve for x algebraically. Be sure to state ALL solutions

12) $x^2 = 49$

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

13) $x^2 + 10 = 91$

$-10 \quad -10$

$x^2 = 81$

$\sqrt{x^2} = \sqrt{81}$

$x = \pm 9$

14) $-5 + 2x^2 = 45$

$+5 \quad +5$

$\frac{2x^2}{2} = \frac{50}{2}$

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5$

Solve each literal equation algebraically for x.

15) $3x - q = 5q$

$\frac{3x}{3} = \frac{6q}{3}$

$x = 2q$

16) $9x - 24a = 6a + 4x$

$\frac{5x}{5} = \frac{30a}{5}$

$x = 6a$

17) $r = 5(x + 2y)$

$r = 5x + 10y$

$r - 10y = 5x$

$\frac{r - 10y}{5} = x$

18) $y = 2x + z$

$y - z = 2x$

$\frac{y - z}{2} = x$

Solve Algebraically. Don't forget your let statement.

19) It costs $7.50 to enter a petting zoo. Each cup of food to feed the animals is $2.50. If you have $12.50, how many cups of food can you buy?

Let c = the # of cups

$\$7.50 + \$2.50c = \$12.50$

$7.50 + 2.50c = 12.50$

$c = 2$

You can buy 2 cups of food.

20) You are selling chocolates that you have made for $3 each. You spent $45 on materials. How many chocolates must you sell to make a profit of $105?

Let c = the # of chocolates

$3c - $45 = $105

3c - 45 = 105

c = 50

You must sell 50 chocolates.

21) Together two items cost $130. One item costs $8 more than the other. Find the cost of each item.

Let x = cost of 1st item

Let x + 8 = cost of 2nd item

x + x + 8 = $130

x + x + 8 = $130

2x + 8 = $130

x = 61

The items cost $61 and $69.

22) You want to buy a bicycle that costs $280. Your parents agree to pay $100 and you have to pay for the rest. You can save $20 a week. How many weeks will it take you to save enough money?

Let w = the # of weeks

$100 + $20w = $280

100 + 20w = 280

w = 9

It will take you 9 weeks.

23) The sum of two consecutive odd integers is -84. Find the lesser of the two integers.

Let n = 1st odd integer

Let n + 2 = 2nd odd integer

n + n + 2 = -84

n + n + 2 = -84

2n + 2 = -84

n = -43

The integers are -43 and -41.

Unit 6: INEQUALITIES

> "Greater Than" ≥ "Greater Than or Equal To"

< "Less Than" ≤ "Less Than or Equal To" ≠ "Not Equal To"

True or False:

4 > 4 False 4 is not greater than 4

4 ≥ 4 True 4 is not greater than 4, however, 4 is equal to 4.

GRAPHING INEQUALITIES

You can only **graph** an inequality on a number line if the **VARIABLE** is **BY ITSELF**.

You solve inequalities the same way you solve equations. Remember, whatever you do to one side of the inequality you must do the same thing to the other side.

When you multiply/divide both sides of the inequality by a negative number you need to FLIP the sign.

Use an Open Circle "○" for > "Greater than" or < "Less than"

Use a Closed Circle "●" for ≥ "Greater than or equal to" or ≤ "Less than or equal to"

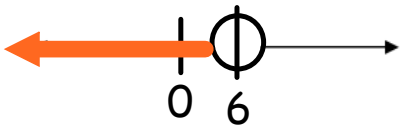
Solve and graph on a number line.

1) $0.5(x + 12) < 9$

$0.5x + 6 < 9$

$x < 6$

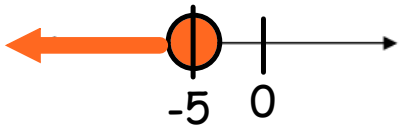
$(-\infty, 6)$



2) $-2x + 7 \geq 17$

$x \leq -5$

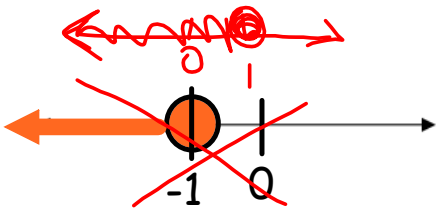
$(-\infty, -5]$



3) $-10x - 2 \geq 8x - 20$

$x \leq +1$

$(-\infty, 1]$

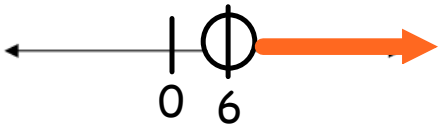


4) $-8x + 12x - 3 > 21$

$4x - 3 > 21$

$x > 6$

$(6, \infty)$



When translating. . .

- Identify the key words
- Translated in the exact order they are read
- Switch the order ONLY when you read: "less than", "more than", "fewer than" , "subtracted from" and "taken away from"
- Place parentheses around sums and differences

Translate the following statements into INEQUALITIES.

5) Four less than twice a number, x is greater than 17. $2x - 4 > 17$

6) Three more than 5 times a number, n is no less than 38. $5n + 3 \geq 38$

7) The quotient of a number, x and 2 increased by 7 is at most 40. $\frac{x}{2} + 7 \leq 40$

8) The elevators, e, in an office building have been approved for no more than 3600 pounds.

$e \leq 3600$

9) An assignment, a, requires at least 45 minutes. $a \geq 45$

10) While shopping, Abby, a, can spend at most $50. $a \leq 50$

Solve Algebraically. Don't forget your let statement.

11) Maria and Dan are raising money to build a playground for their neighborhood. They already raised $2157 from 2 carwashes and a carnival. The total cost of the playground is $4500. To raise the rest of the money they are going to put on a talent show and sell tickets for $12 each. What is the minimum number of tickets they must sell to raise enough money to pay for the new playground?

Let x = # of tickets

12x + $2157 ≥ $4500

12x + 2157 ≥ 4500

12x ≥ 2343

x ≥ 195.25

They must sell at least 196 tickets.

12) Kaylee and Michelle are going to the movies. They have $38 to spend and movie tickets are $12.75 each. If boxes of candy cost $3 each, how many boxes of candy can the girls buy?

Let x = # of boxes

3x + $12.75 ≤ $38

3x + 12.75 ≤ 38

3x ≤ 25.25

x ≤ 8.41666... → 4.16

They can buy at most ~~8~~ 4 boxes.

Unit 7: Ratios, Rates & Proportionality

We use proportions to solve for missing information, to solve word problems, conversion problems, scale problems and so much more. The key to using proportions correctly is to

BE CONSISTENT!!!!

Express each rate as a unit rate.

1) 6 pounds lost in 12 weeks

2) $800 for 40 tickets

Solve albebraically.

3) $\frac{5}{12} = \frac{x}{5}$

4) $\frac{6}{16} = \frac{x}{24}$

5) The distance between two cities on a map is 3.2 cm. If the scale on the map is 1 cm = 50 km, find the **actual** distance between the two cities.

Solve Algebraically. Don't forget your let statement.

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$12x \geq 2343$

$x \geq 195.25$

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Let x = # of boxes

$3x + \$12.75 \leq \$38$

$3x + 12.75 \leq 38$

$3x \leq 25.25$

$x \leq 8.41666...$

They can buy at most 8 boxes.

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We use proportions to solve for missing information, to solve word problems, conversion problems, scale problems and so much more. The key to using proportions correctly is to

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Express each rate as a unit rate.

1) 6 pounds lost in 12 weeks

0.5 pounds /week

2) $800 for 40 tickets

$20 /ticket

Solve albebraically.

3) $\frac{5}{12} = \frac{x}{5}$

$\frac{12x}{12} = \frac{25}{12}$

$x = 2\frac{1}{12}$

4) $\frac{6}{16} = \frac{x}{24}$

$\frac{16x}{16} = \frac{144}{16}$

$x = 9$

5) The distance between two cities on a map is 3.2 cm. If the scale on the map is 1 cm = 50 km, find the **actual** distance between the two cities.

Let n = the actual distance

$\frac{1\text{ cm}}{50\text{ km}} = \frac{3.2\text{ cm}}{n\text{ km}}$

$\frac{1n}{1} = \frac{160}{1}$

$n = 160$

The actual distance between the cities is 160 km.

6) A 14-ounce energy drink contains $10\frac{1}{2}$ teaspoons of sugar. How much sugar is on one ounce of the drink?

$$\frac{10\frac{1}{2} \text{ teaspoons}}{14 \text{ ounces}} = 0.75 \text{ teaspoons/ ounce}$$

7) In $4\frac{1}{2}$ minutes Benny swims 6 laps. What is this rate in minutes per lap?

$$\frac{4\frac{1}{2} \text{ minutes}}{6 \text{ laps}} = 0.75 \text{ minutes/ lap}$$

8) Find the UNIT PRICE to tell which is the better buy. Show all work and explain.

20 pounds of pet food for $14.99 **OR** 50 pounds of pet food for $37.99

$\frac{\$14.99}{20 \text{ pounds}} = 0.7495 \rightarrow \$0.75/\text{ pound}$

$\frac{\$37.99}{50 \text{ pounds}} = 0.7598 \rightarrow \$0.76/\text{ pound}$

The 20 pound bag is a better buy because it costs less per pound.

9) Find the UNIT PRICE to tell which is the better buy. Show all work and explain.

2 DVDs for $26.50 **OR** 3 DVDs for $40.00

$\frac{\$26.50}{2 \text{ DVD's}} = 13.25 \rightarrow \$13.25/\text{ DVD}$

$\frac{\$40.00}{3 \text{ DVD's}} = 13.3333\ldots \rightarrow \$13.33/\text{ DVD}$

The 2 pack of CD's is a better buy because it costs less per DVD.

10) A grocery store sells different types of Trail Mix. The cost and weight of each type is shown in the table.

	Trail Mix A	Trail Mix B	Trail Mix C
Cost ($)	6	8.50	2.25
Weight	$\frac{3}{4}$ lb	1 lb	4 oz

4 oz = 0.25 lb

1 lb = 16 oz

Which statement is correct?

A Trail Mix A is the best buy.

B Trail Mix B is the best buy.

C Trail Mix C is the best buy.

D They are all the same price.

A $\rightarrow \frac{\$6}{0.75 \text{ lb}} \rightarrow \$8/\text{ pound}$

B $\rightarrow \frac{\$8.50}{1 \text{ lb}} \rightarrow \$8.50/\text{ pound}$

C $\rightarrow \frac{\$2.25}{0.25 \text{ lb}} \rightarrow \$9/\text{ pound}$