

Math 115

Spring 2019

Lecture 6

$$? a^2 + b^2 = c^2 ?$$

$$y = mx + b \quad ? d = rt$$

Feb 19-8:47 AM

Class Qz (Box Your Final Ans.)

1) Solve $4(3x - 2) - 12 = x - 40$

$$12x - 8 - 12 = x - 40 \quad \rightarrow \quad 12x - x = -40 + 20$$

$$12x - 20 = x - 40 \quad \rightarrow \quad 11x = -20$$

$$\boxed{x = \frac{-20}{11}}$$

$$\left\{ \frac{-20}{11} \right\}$$

2) Translate only: 3 times the difference of 12 and twice some number.

$$\boxed{3(12 - 2x)}$$

Let x be the number

3) 12% of what number is 30?

$$\frac{12}{100} \cdot x = 30$$

$$.12x = 30$$

$$\rightarrow x = \frac{30}{.12}$$

$$\boxed{x = 250}$$

12% of 250 is 30.

Formula is an equation with more than one variable.

$$y = 3x - 10, \quad 4x - 3y = 12, \quad A = LW$$

$$P = 2L + 2W, \quad A = \pi r^2, \quad C = \pi d$$

Solve $A = LW$ for L .

We need to isolate L .

$$A = LW$$

Divide both sides by W .

$$\frac{A}{W} = \frac{LW}{W}$$

$$\boxed{\frac{A}{W} = L}$$

Solve $P = a + b + c$ for b .

We need to isolate b .

$$P = \textcircled{a} + b + \textcircled{c}$$

$$\boxed{P - a - c = b}$$

Solve $P = 2L + 2W$ for W .

Isolate W

$$P = \textcircled{2L} + 2W$$

$$P - 2L = \boxed{2W}$$

$$\frac{P - 2L}{2} = \frac{2W}{2}$$

$$\boxed{\frac{P - 2L}{2} = W}$$

Solve $A = \frac{bh}{2}$ for h .

Hint: Use LCD
to clear fractions

$$A = \frac{bh}{2}$$

$$2 \cdot A = \cancel{2} \cdot \frac{bh}{\cancel{2}}$$

$$\text{LCD} = 2$$

$$2A = \boxed{b}h$$

To isolate h , divide by b

$$\frac{2A}{b} = \frac{\cancel{b}h}{\cancel{b}} \Rightarrow \boxed{h = \frac{2A}{b}}$$

$(3x) + 2y = 6$, Solve for y .

"isolate y "

$$\boxed{2}y = -3x + 6$$

$$\frac{\cancel{2}y}{\cancel{2}} = \frac{-3x + 6}{2} \Rightarrow y = \frac{-3}{2}x + \frac{6}{2}$$

$$\boxed{y = \frac{-3}{2}x + 3}$$

$$y = mx + b$$

Slope - Int. Form
ch. 3

Solve $3x - 4y = 8$ for y .

$$\textcircled{3x} - 4y = 8$$

$$\boxed{-4y} = -3x + 8$$

$$\frac{\cancel{-4y}}{\cancel{-4}} = \frac{-3}{-4}x + \frac{8}{-4}$$

$$\boxed{y = \frac{3}{4}x - 2}$$

$$y = mx + b$$

Solve $\frac{x}{3} + \frac{y}{2} = 1$ for y .

Hint:
Use LCD to
clear fractions

$$\text{LCD} = 6$$

$$\overset{2}{\cancel{6}} \cdot \frac{x}{\cancel{3}} + \overset{3}{\cancel{6}} \cdot \frac{y}{\cancel{2}} = 6 \cdot 1$$

$$\textcircled{2x} + 3y = 6$$

$$\boxed{3y} = -2x + 6$$

$$y = -\frac{2}{3}x + \frac{6}{3}$$

$$\boxed{y = -\frac{2}{3}x + 2}$$

3 times the sum of some number and 1, reduced by -8 is equal to the number increased by 13. Find the number.

$$3(x + 1) - (-8) = x + 13$$

$$3x + 3 + 8 = x + 13$$

$$3x + 11 = x + 13$$

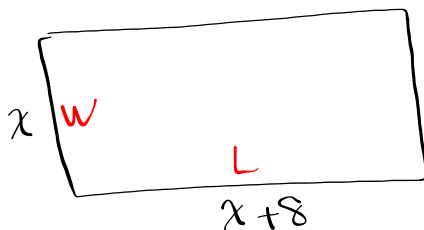
$$3x - x = 13 - 11$$

$$2x = 2$$

$$x = 1$$

The number is 1.

Find x if the perimeter of the rectangle below is 36 ft.



$$P = 2L + 2W$$

$$36 = 2(x+8) + 2(x)$$

$$36 = 2x + 16 + 2x$$

$$36 = 4x + 16$$

$$36 - 16 = 4x$$

$$4x = 20$$

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

$$x = 5$$

x is 5.

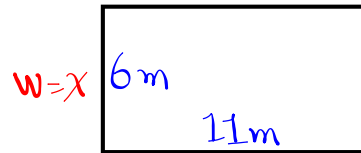
The length of a rectangle is 1m shorter than twice its width.

Perimeter is 34m.

1) Draw & clearly label such rectangle.

2) Find its dimensions

3) Find its area.



$$L = 2x - 1$$

$$P = 2L + 2W$$

$$P = 34$$

$$2L + 2W = 34$$

$$2(2x - 1) + 2(x) = 34$$

$$4x - 2 + 2x = 34$$

$$6x - 2 = 34$$

$$6x = 36$$

$$x = 6$$

Dimensions
6m by 11m.

$$A = LW = 11(6) = 66 \text{ m}^2$$

The length of a rectangle is 1ft longer than twice its width.

Its perimeter is 44 ft.

Find its area.

$$P = 44$$

$$2L + 2W = 44$$

$$2(2x + 1) + 2(x) = 44$$

$$4x + 2 + 2x = 44$$

$$6x = 42$$

$$x = 7$$



$$L = 2x + 1$$

$$\begin{aligned} A &= LW \\ &= 15(7) \\ &= 105 \text{ ft}^2 \end{aligned}$$

15 ft, 7 ft

Two Sides of a triangle are equal.

the third side is 3 inches less than the sum
of equal sides. The perimeter is 37 inches.

Find all 3 Sides.

$$P = 37$$

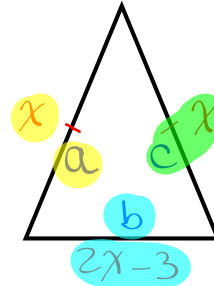
$$a + b + c = 37$$

$$x + 2x - 3 + x = 37$$

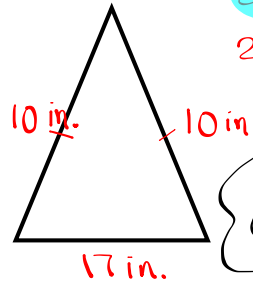
$$4x - 3 = 37$$

$$4x = 40$$

$$x = 10$$



$$2(10) - 3 = 20 - 3 = 17$$



Three Sides
are 10 in, 10 in, and
17 in.

Linear Inequalities:

Final Ans:

$$x > \quad x \geq \quad x < \quad x \leq \quad \leq x <$$

$$< x \leq \quad < x < \quad \leq x \leq$$

we do everything like Solving linear equations
but when we divide or multiply by a
negative number, we must reverse the
inequality.

Solve: $3x - 7 < x + 13$

$$3x - x < 13 + 7$$

$$2x < 20$$

Divide by 2

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

$$x < 10$$

Solve and graph

$$x - 8 \leq 3x - 26$$

Variables on the left side, numbers on the other side.

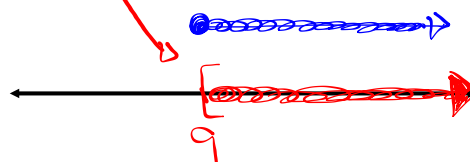
$$x - 3x \leq -26 + 8$$

$$-2x \leq -18$$

Divide by -2,

$$\frac{-2}{-2}x \geq \frac{-18}{-2}$$

$$x \geq 9$$



Solve and graph

$$2(x-3) + 10 \geq 5x + 28$$

$$2x - 6 + 10 \geq 5x + 28$$

$$2x + 4 \geq 5x + 28$$

$$2x - 5x \geq 28 - 4$$

$$-3x \geq 24$$

Divide both sides by -3

$$\frac{-3}{-3}x \leq \frac{24}{-3}$$

$$x \leq -8$$



Solve and graph

$$\frac{1}{2}x - \frac{3}{4} < \frac{2}{3}x + \frac{5}{6}$$

Hint: Use LCD to clear fractions

$$\cancel{12} \cdot \frac{1}{2}x - \cancel{12} \cdot \frac{3}{4} < \cancel{12} \cdot \frac{2}{3}x + \cancel{12} \cdot \frac{5}{6}$$

LCD=12

$$6x - 9 < 8x + 10$$

$$6x - 8x < 10 + 9$$

$$-2x < 19$$

Divide both sides by -2

$$\frac{-2}{-2}x > \frac{19}{-2}$$

$$x > -9.5$$



Solve $-3 < 2x - 5 \leq 11$

we want x to be in the middle & isolated.

Add 5 to all 3 sides

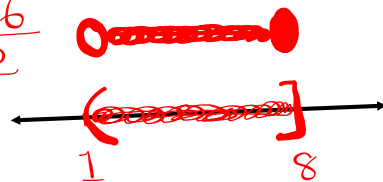
$$-3 + 5 < 2x - \cancel{5} + \cancel{5} \leq 11 + 5$$

$$2 < 2x \leq 16$$

Divide all 3 sides by 2.

$$\frac{2}{2} < \frac{2}{2}x \leq \frac{16}{2}$$

$$1 < x \leq 8$$



Graph & shade

$$-2 \leq 3x + 7 < 43$$

$$-2 - 7 \leq 3x + 7 - 7 < 43 - 7$$

$$-9 \leq 3x < 36$$

Divide by 3

$$\frac{-9}{3} \leq \frac{3}{3}x < \frac{36}{3}$$

$$-3 \leq x < 12$$



$$-4 \leq -2x + 6 \leq 10 \quad \text{Solve \& Graph}$$

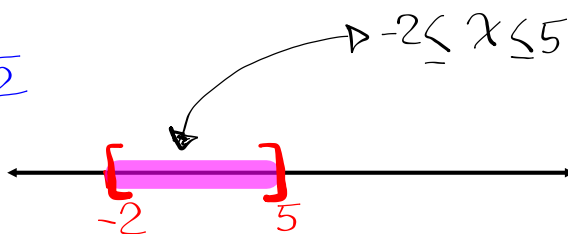
$$-4 - 6 \leq -2x + 6 - 6 \leq 10 - 6$$

$$-10 \leq -2x \leq 4$$

Divide by -2

$$\frac{-10}{-2} \geq \frac{-2}{-2}x \geq \frac{4}{-2}$$

$$5 \geq x \geq -2$$



It takes Lisa 20 minutes to do 6 math Problems. How long does she need to do 25 problems?

$$\frac{20 \text{ minutes}}{6 \text{ Problems}} = \frac{x \text{ minutes}}{25 \text{ problems}}$$

Solve $\frac{20}{6} = \frac{x}{25}$ $6x = 20(25)$ $x = \frac{20(25)}{6}$

$$x = \frac{500}{6}$$

$$x \approx 83.\bar{3}$$

Round-up
About 84 minutes

John paid \$12.75 for 2.5 lb. of apples.

How much does he need if he wants to buy 8 lb. of same apples?

$$\frac{\$12.75}{2.5 \text{ lb.}}$$

$$\frac{\$x}{8 \text{ lb.}}$$

Solve $\frac{12.75}{2.5} = \frac{x}{8}$

Cross-Multiply

$$2.5x = 8(12.75)$$

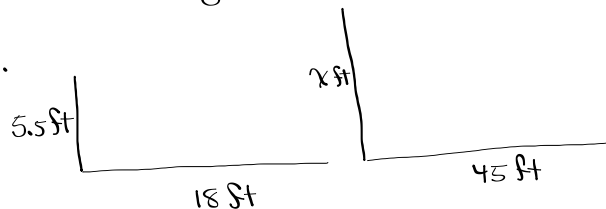
$$x = \frac{8(12.75)}{2.5}$$

$$x = \frac{102}{2.5}$$

$$x = 40.8$$

\$40.80

A 5.5 ft tall person has a shadow of 18 ft long. At the same time, a flag post has a shadow of 45 ft long. Find the height of the flag post.



$$\frac{5.5 \text{ ft}}{18 \text{ ft}} = \frac{x \text{ ft}}{45 \text{ ft}}$$

Solve $\frac{5.5}{18} = \frac{x}{45}$

Cross-multiply

$$18x = 5.5(45)$$

$$x = \frac{5.5(45)}{18}$$

$$x = \frac{247.5}{18}$$

$$x = 13.75$$

13.75 ft tall

How many fish in East LA Pond?

Maria caught 25 fish, tagged them all, and put them back in water.

A week later, she caught 20 fish, but only 3 of them had tags. Use proportion to find the # of fish in East LA pond.

$$\frac{x \text{ fish}}{25 \text{ tagged}} = \frac{20 \text{ fish}}{3 \text{ tagged}}$$

If you round-up,
About 167 fish.

$$\text{Solve } \frac{x}{25} = \frac{20}{3}$$

$$3x = 25(20)$$

$$3x = 500$$

$$x = \frac{500}{3}$$

$$x = 166.\bar{6}$$

$$\text{Solve } \frac{2x - 7}{3x + 5} = \frac{2}{3}$$

(cross-multiply)

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

$$\cancel{6x} - 21 = \cancel{6x} + 10$$

$$-21 = 10 \rightarrow \text{False}$$

Equation is
contradiction.

\rightarrow No Soln

$\rightarrow \emptyset$

Solve

$$x-4 = \frac{3x-12}{3}$$

Hint: $x = \frac{x}{1}$

$$\frac{x-4}{1} = \frac{3x-12}{3}$$

Cross-multiply

$$3(x-4) = 1(3x-12)$$

$$\cancel{3x} - \cancel{12} = \cancel{3x} - \cancel{12}$$

$$0 = 0 \rightarrow \text{True}$$

Equation is

infinite # of Solns.

an identity.

Turn in SG2, Due tomorrow \mathbb{R} SG3, WP3