# Math 115

# Spring 2019

# Lecture 7

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

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

Feb 19-8:47 AM

Class Qz (Box your final ans)

1) Solve: $\frac{1}{2}x - \frac{3}{4} = \frac{1}{3}x$

LCD = 12

$\cancel{12}^{6} \cdot \frac{1}{\cancel{2}}x - \cancel{12}^{3} \cdot \frac{3}{\cancel{4}} = \cancel{12}^{4} \cdot \frac{1}{\cancel{3}}x$

$6x - 9 = 4x$

$6x - 4x = 9$

$2x = 9$

$\boxed{x = \frac{9}{2}}$ $\left\{\frac{9}{2}\right\}$

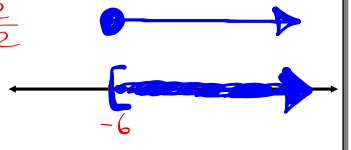
2) Solve & graph $x - 7 \leq 3x + 5$

$x - 3x \leq 5 + 7$

$-2x \leq 12$

$\frac{-2}{-2}x \geq \frac{12}{-2}$

$\boxed{x \geq -6}$




3) Solve: $\frac{2x + 3}{5x - 1} = \frac{2}{5}$

Cross-Multiply

$5(2x + 3) = 2(5x - 1)$

$10x + 15 = 10x - 2$

$10x - 10x = -2 - 15$

$0 = -17$

False

NO Solution

or $\boxed{\emptyset}$

Solve and graph

$4x - 17 > 3(2x - 1)$

$4x - 17 > 6x - 3$

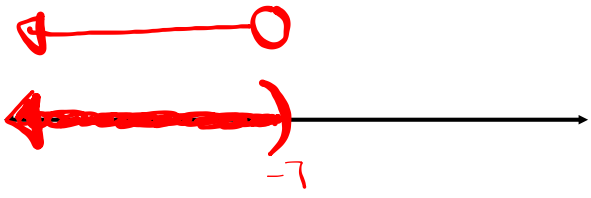
$4x - 6x > -3 + 17$

$-2x > 14$

Divide by $-2$

$\frac{-2}{-2}x < \frac{14}{-2}$

$x < -7$




Solve & graph

$-2 < 3x + 4 \leq 19$

Hint: Isolate the variable in the middle.

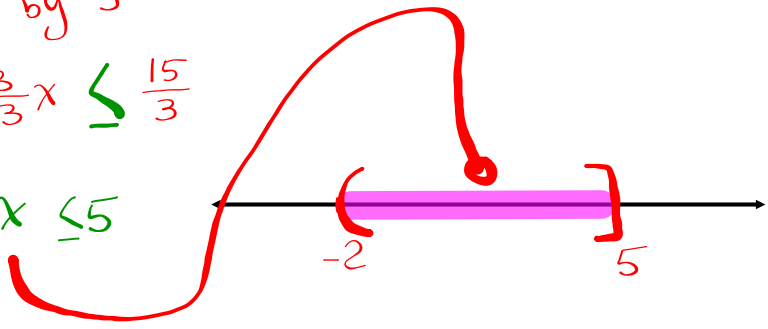
$-2 - 4 < 3x + 4 - 4 \leq 19 - 4$

$-6 < 3x \leq 15$

Divide by 3

$\frac{-6}{3} < \frac{3}{3}x \leq \frac{15}{3}$

$-2 < x \leq 5$



Solve for the indicated variable

1) $P = 4S$ for $S$

$\frac{P}{4} = \frac{4}{4}S \Rightarrow S = \frac{P}{4}$

2) $P = 2L + 2W$ for $W$

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

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

3) $A = \frac{h(B+b)}{2}$ for $h$

Multiply by 2 to clear fraction.

$2A = h(B+b)$

Divide both sides by $B+b$

$\frac{2A}{B+b} = \frac{h(B+b)}{B+b} \Rightarrow h = \frac{2A}{B+b}$

Solve for $y$, write final ans in $y = mx+b$

1) $5x + 2y = 4$

$2y = -5x + 4$

$\frac{2}{2}y = \frac{-5}{2}x + \frac{4}{2} \Rightarrow y = \frac{-5}{2}x + 2$

2) $3x - 4y = 20$

$-4y = -3x + 20$

$\frac{-4}{-4}y = \frac{-3}{-4}x + \frac{20}{-4} \Rightarrow y = \frac{3}{4}x - 5$

3) $\frac{3}{4}x + \frac{1}{5}y = 1$

Hint: use LCD to clear fractions

LCD = 20

$20 \cdot \frac{3}{4}x + 20 \cdot \frac{1}{5}y = 20 \cdot 1$

$15x + 4y = 20$

$4y = -15x + 20$

$\frac{4}{4}y = \frac{-15}{4}x + \frac{20}{4}$

$y = \frac{-15}{4}x + 5$

$-6 \leq x$

$\div -6$

$x \geq -6$

Solve for y

$5x - 2y + 1 \leq 3y - 2x + 6$

y-variables on the left side, anything else on the right side

$-2y - 3y \leq -2x + 6 - 5x - 1$

$-5y \leq -7x + 5$

Divide by $-5$

$\frac{-5}{-5}y \geq \frac{-7}{-5}x + \frac{5}{-5}$

$y \geq \frac{7}{5}x - 1$

24 apples for $5.

How much for 80 apples?

$$\frac{24 \text{ Apples}}{\$5} = \frac{80 \text{ apples}}{\$x}$$

Solve $\frac{24}{5} = \frac{80}{x}$

$24x = 5(80)$

$x = \frac{5(80)}{24}$ (10, 3)

$x = \frac{50}{3}$

$= 16.6666\ldots$

$= 16.\overline{6}$

Nearest cents $\Rightarrow$ \$16.67

Nearest dollar $\Rightarrow$ \$17

4 rooms were painted in 2.5 days.

How many days for 15 rooms to be Painted?

$$\frac{4 \text{ Rooms}}{2.5 \text{ Days}} = \frac{15 \text{ Rooms}}{x \text{ Days}}$$

$4x = 2.5(15)$

$x = \frac{2.5(15)}{4}$

$x = 9.375$

About 9.4 days

About 9 days (Round to a whole #)

Solve: $\frac{3x+8}{x-4} = \frac{5}{2}$ Hint: Cross-multiply

$2(3x+8) = 5(x-4)$

$6x + 16 = 5x - 20$

$6x - 5x = -20 - 16$

$x = -36 \Rightarrow \{-36\}$

Simplify $\dfrac{3\frac{2}{3} - 1\frac{1}{4}}{2\frac{5}{6}}$

① Convert mixed numbers to improper fractions.

② Use LCD to clear all fractions.

$= \dfrac{\frac{11}{3} - \frac{5}{4}}{\frac{17}{6}}$ LCD = 12

$= \dfrac{\cancel{12}^{4} \cdot \frac{11}{\cancel{3}} - \cancel{12}^{3} \cdot \frac{5}{\cancel{4}}}{\cancel{12}^{2} \cdot \frac{17}{\cancel{6}}} = \dfrac{44 - 15}{34} = \boxed{\dfrac{29}{34}}$

what percent of 220 is 550?

$\frac{P}{100} \cdot 220 = 550$

$\frac{220}{100} P = 550$

$2.2P = 550$

$P = \frac{550}{2.2}$

$P = 250$

250% of 220 is 550.

$\frac{P}{100} = \frac{\text{Part}}{\text{whole}}$

$\frac{P}{100} = \frac{550}{220}$

$\frac{P}{100} = \frac{55}{22} = \frac{5}{2}$

$\frac{P}{100} = \frac{5}{2}$

$2P = 500$

$P = 250$

Back to inequalities:

Final Ans can be written in

- Set-Builder Notation
- Interval notation
- Graphing

$x \leq 5$ S.B.N. $\{x \mid x \leq 5\}$

Such that


Graphing

I.N. $(-\infty, 5]$

$x > -2$

S.B.N. $\Rightarrow \{x \mid x > -2\}$

Such that

Graphing


I.N. $\Rightarrow (-2, \infty)$

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$-3 \leq x < 4$

S.B.N. $\{x \mid -3 \leq x < 4\}$

Graph


I.N. $[-3, 4)$

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4 times some number increased by 2 is equal to 7 times the number reduced by 19.

Find the number.

$4x + 2 = 7x - 19$

$4x - 7x = -19 - 2$

$-3x = -21$

$x = 7$

The number is 7.

There were 40 people in a room.

The # of females was 6 more than the # of males.

How many of each?

Total = 40

Females + Males = 40

Males → $x$

Females → $x+6$

$x+6 + x = 40$

$2x + 6 = 40$

$2x = 34$

$x = 17$

17 males & 23 Females

Lisa has a total of 37 coins.

Dimes and nickels only.

The # of nickels is 1 more than twice # of dimes.

Dimes → $x$

Nickels → $2 \cdot x + 1$

1) How many of each?

2) How much money does she have?

Nickels + Dimes = 37

$2x+1 + x = 37$

$3x + 1 = 37$

$3x = 36$

$x = 12$

12 Dimes & 25 Nickels

$12(10¢) + 25(5¢)$

$= 120¢ + 125¢ \Rightarrow \$2.45$

John purchased 67 markers.

Red, Blue, and Green only.

# of Blue was 1 more than twice # Red.

# of Green " 2 less than # of Red.

How many of each? Total is 67.

Red + Blue + Green = 67

$x + 2x+1 + x-2 = 67$

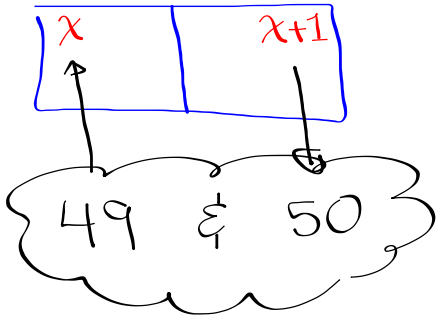
$4x - 1 = 67$

$4x = 68$

$x = 17$

17 Red,
35 Blue,
and
15 Green

The Sum of Facing Pages on a open book was 99. What are the page numbers?




$x + x+1 = 99$

$2x + 1 = 99$

$2x = 98$

$x = 49$

The length of a rectangle is 2 cm shorter than 3 times its width. The perimeter is 76 cm.

Find its Area.

$L = 3x - 2$

$P = 76$ $\quad W = x$

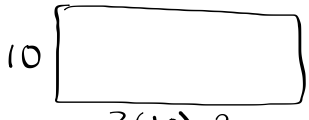
$2L + 2W = 76$

$2(3x-2) + 2(x) = 76$

$6x - 4 + 2x = 76$

$8x = 80$

$x = 10$



$3(10)-2 = 28$

$\text{Area} = LW$

$= 10(28)$

$= 280 \text{ cm}^2$

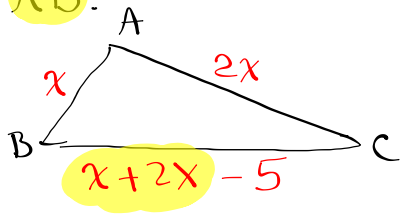
In triangle ABC,

Side AC is twice Side AB.

Side BC is 5 inches shorter than the sum of sides AC and AB.

Perimeter is 55 inches.

Find All three Sides




$P = 55$

$x + 2x + x + 2x - 5 = 55$

$6x - 5 = 55$

$6x = 60 \quad x = 10$

10 in, 20 in, and 25 in.