

Math 115

Fall 2018

Lecture 8

$$\begin{array}{l} ? a^2 + b^2 = c^2 ? \\ y = mx + b \quad ? \quad d = rt \end{array}$$

Feb 19-8:47 AM

Some Review:

① Simplify: $\frac{2\frac{1}{3} - 3\frac{1}{2}}{1\frac{5}{6}} = \frac{\frac{7}{3} - \frac{7}{2}}{\frac{11}{6}} = \frac{6 \cdot \frac{7}{3} - 6 \cdot \frac{7}{2}}{6 \cdot \frac{11}{6}}$

LCD=6

$$= \frac{14 - 21}{11} = \boxed{\frac{-7}{11}}$$

② Evaluate $-b - \sqrt{b^2 - 4ac}$ for $a=2$, $b=5$, and $c=-3$

$$\begin{aligned} &= -5 - \sqrt{5^2 - 4(2)(-3)} = -5 - \sqrt{25 - 4(2)(-3)} \\ &= -5 - \sqrt{25 + 24} = -5 - \sqrt{49} = -5 - 7 = \boxed{-12} \end{aligned}$$

③ Simplify: $3(2x^2 - 5x + \frac{1}{3}) - 2(3x^2 - 7x + \frac{1}{2})$

$$\begin{aligned} &= 3(2x^2) - 3(5x) + 3 \cdot \frac{1}{3} - 2(3x^2) + 2(7x) - 2 \cdot \frac{1}{2} \\ &= \cancel{6x^2} - 15x + \cancel{1} - \cancel{6x^2} + 14x - \cancel{1} = -1x = \boxed{-x} \end{aligned}$$

Nov 1-6:05 AM

④ Name the properties:

$$(5 + x) - 5 = (x + 5) - 5 \quad \text{Commutative}$$

$$= x + (5 - 5) \quad \text{Associative}$$

$$= x + 0 \quad \text{Inverse}$$

$$= x \quad \text{Identity}$$

⑤ Translate only: 3 times the sum of x^2 and 8 is equal to x less -8 .

$$3 \cdot (x^2 + 8) = x - (-8)$$

Nov 1-6:16 AM

⑥ The ratio of $2x-3$ to $3x+2$ is the same as the ratio of 2 to 3 .

Find x .

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

Cross-multiply

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

$$6x-9 = 6x+4$$

$$-9 = 4$$

false

NO Solution

$\emptyset$

$\{ \}$

⑦ what percent of 400 is 74?

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

$$\frac{P}{100} = \frac{74}{400}$$

$$P = \frac{74}{4} = 18.5$$

18.5% of 400 is 74.

Nov 1-6:22 AM

⑧ Solve: $4(x-3) + 6x + 2 = 5(2x-1) - 5$

$$4x - 12 + 6x + 2 = 10x - 5 - 5$$

$$10x - 10 = 10x - 10$$

$$0 = 0$$

⑨ Solve: $\frac{3}{5}x - \frac{1}{2} = \frac{1}{2}x - \frac{4}{5}$

LCD=10

$$2 \cdot 3x - 5 \cdot 1 = 5 \cdot 1x - 2 \cdot 4$$

$$6x - 5 = 5x - 8$$

$$6x - 5x = -8 + 5$$

$$x = -3$$

$$\{-3\}$$

infinite # of
Solutions
 $\mathbb{R}$

Identity

Conditional

⑩ $2.5x + 18 = -1.5x + 13$

$$2.5x + 1.5x = 13 - 18$$

$$4x = -5$$

$$x = -\frac{5}{4}, x = -1\frac{1}{4}, x = -1.25$$

$$\{-\frac{5}{4}\}$$

Nov 1-6:30 AM

⑪ 4 times the difference of Some number and 8 is equal to 20 less than twice the number. Find square of the number.

$$4(x - 8) = 2x - 20$$

Let x be the
number

$$4x - 32 = 2x - 20$$

$$4x - 2x = -20 + 32$$

$$2x = 12$$

$$x = 6$$

The number is
6.

Square of the
number is 36.

Nov 1-6:40 AM

- ⑫ Raul has 53 coins. Dimes & Nickels only.
 The # of dimes is 1 fewer than two times
 The # of nickels. $\text{Dime} = 2 \cdot \text{Nickel} - 1$

① How many of each does he have?

② How much money does he have?

$\text{Dimes} + \text{Nickels} = 53 \text{ coins}$ $x \rightarrow \text{Nickels}$
 $2x-1 \rightarrow \text{Dimes}$

$$2x-1 + x = 53 \rightarrow x=18$$

$$3x = 54$$

$$18(5\phi) + 35(10\phi)$$

$$= 90\phi + 350\phi$$

$$= 440\phi = \$4.40$$

18 Nickels
 &
 35 Dimes

Nov 1-6:49 AM

Solve, give answer in all methods discussed in class

⑬ $-3(x+2) + 4 > 2(4+x) - 6$

$$-3x - 6 + 4 > 8 + 2x - 6$$

$$-3x - 2 > 2x + 2$$

$$-3x - 2x > 2 + 2$$

$$-5x > 4$$

$$x < \frac{4}{-5}$$

$$x < -.8$$

① S.B.N.

$$\{x \mid x < -\frac{4}{5}\}$$

② Graph



③ I.N.

$$(-\infty, -.8)$$

⑭ $-8 \leq 2x + 4 < 14$

$$-8 - 4 \leq 2x < 14 - 4$$

$$-12 \leq 2x < 10$$

$$-6 \leq x < 5$$

① S.B.N.

$$\{x \mid -6 \leq x < 5\}$$

② Graph



③ I.N.

$$[-6, 5)$$

Nov 1-6:55 AM

⑮ Solve for h : $A = \frac{h(B+b)}{2}$
 multiply by 2
 $2A = h(B+b)$ $\frac{2A}{B+b} = \frac{h(B+b)}{B+b}$ $h = \frac{2A}{B+b}$

⑯ Solve for y : $6x - 5y = 10$
 $-5y = -6x + 10$
 $\frac{-5}{-5}y = \frac{-6}{-5}x + \frac{10}{-5}$
 $y = \frac{6}{5}x - 2$

⑰ Solve for y : $8x - 2y + 8 \leq 2x + 3y - 2$
 $-2y - 3y \leq 2x - 2 - 8x - 8$
 $-5y \leq -6x - 10$
 $\frac{-5}{-5}y \geq \frac{-6}{-5}x - \frac{10}{-5}$
 $y \geq \frac{6}{5}x + 2$

Nov 1-7:06 AM

Find two consecutive integers such that
 5 times the smaller one reduced by 3 times
 the larger one is equal to 43.

x & $x+1$ Smaller $\rightarrow x$
 Larger $\rightarrow x+1$

$$5 \cdot \text{Smaller} - 3 \cdot \text{larger} = 43$$

$$5x - 3(x+1) = 43$$

$$5x - 3x - 3 = 43$$

$$2x = 46$$

$$x = 23$$

$$23 \text{ \& } 24$$

Nov 1-7:36 AM

Find two consecutive even integers
Such that 4 times the larger one is
equal to 610 less 3 times the smaller one.

$$x \text{ \& } x+2$$

x must be
even

$$4 \cdot \text{larger} = 610 - 3 \cdot \text{smaller}$$

$$4(x+2) = 610 - 3x$$

$$4x + 8 = 610 - 3x$$

$$4x + 3x = 610 - 8$$

$$7x = 602$$

$$x = 86$$

$$86 \text{ \& } 88$$

Nov 1-7:42 AM

Find two consecutive odd integers such that
the sum of 5 times smaller one and 187
is equal to 8 times the larger one.

$$x \text{ \& } x+2$$

x must be
odd

$$5 \cdot \text{smaller} + 187 = 8 \cdot \text{larger}$$

$$5x + 187 = 8(x+2)$$

$$5x + 187 = 8x + 16$$

$$5x - 8x = 16 - 187$$

$$-3x = -171$$

$$x = \frac{-171}{-3}$$

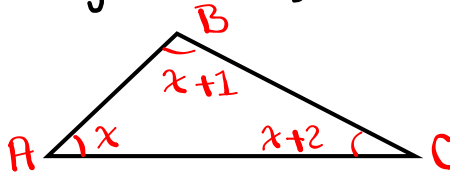
$$x = 57$$

$$57 \text{ \& } 59$$

Nov 1-7:48 AM

The three angles in triangle ABC are three consecutive integers. Find the Largest angle.

FACT: $A+B+C=180^\circ$



$$x + x+1 + x+2 = 180$$

$$3x + 3 = 180$$

$$3x = 177$$

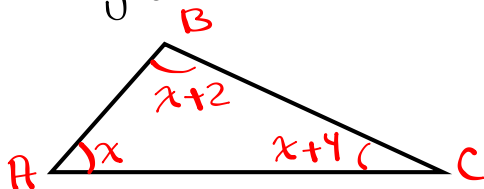
$$x = 59$$

The largest angle is 61°

Nov 1-7:54 AM

Three angles of triangle ABC are three consecutive odd integers. Find the smallest angle.

FACT: $A+B+C=180^\circ$



$$x + x+2 + x+4 = 180$$

$$3x + 6 = 180$$

$$3x = 174$$

$$x = 58$$

x must be odd

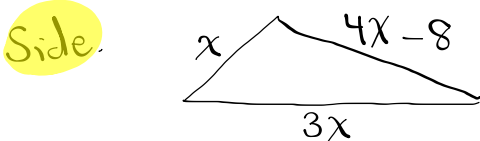
No such triangle exist.

Nov 1-7:58 AM

Perimeter of a triangle is 48 in.

One side is 3 times another side.

The third side is 8 inches shorter than the sum of other sides. Find the longest side.



Longest side is 21 in.

$$P = 48$$

$$a + b + c = 48$$

$$x + 3x + 4x - 8 = 48$$

$$8x = 56$$

$$x = 7$$

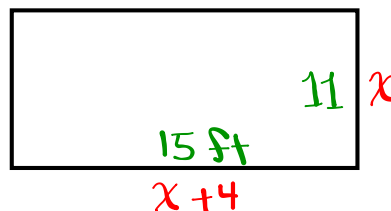
Nov 1-8:50 AM

The length of a rectangle is 4 ft longer than its width.

The sum of 4 times its width and 3 times its length is 89 ft.

Find its perimeter.

$$4 \text{ width} + 3 \cdot \text{length} = 89$$



$$4x + 3(x + 4) = 89$$

$$4x + 3x + 12 = 89$$

$$7x = 77$$

$$x = 11$$

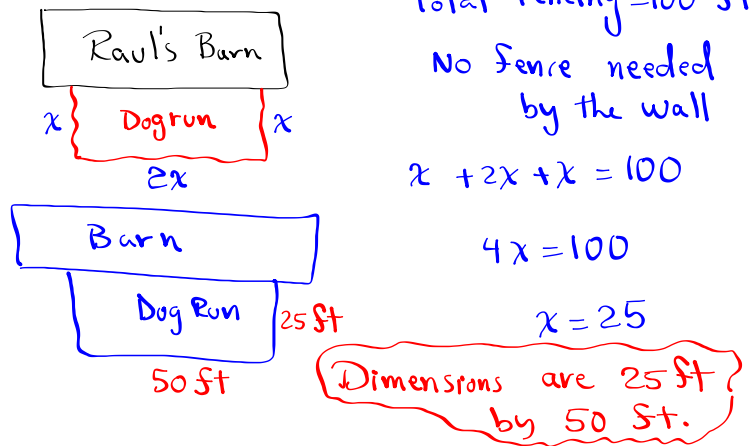
$$P = 2L + 2W$$

$$= 2(15) + 2(11)$$

$$= 52 \text{ ft}$$

Nov 1-8:56 AM

Raul has 100 feet of fencing. He wants to build a dog run on the side of his barn. He wishes to have a rectangular dog run which is twice as long as it is wide. Find the dimensions of this dog run.



Nov 1-9:02 AM

Agenda for Monday:

- 1) At 6:00 AM: collect wp 5 & 6
collect SG 5, 6, and 7.
- 2) Lecture on New materials from
6:00 AM to 7:45 AM
- 3) Exam 1: 7:45 AM — ?

Nov 1-9:09 AM