Math 115

Spring 2019

Lecture 8

$? a^2 + b^2 = c^2 ?$
$y = mx + b$ $?$ $d = rt$

Feb 19-8:47 AM

① Solve and express your final ans in all different methods.

$$-2(x+5) - 1 < 3x + 9$$

Distribute, Simplify, <u>isolate x</u> on the LHS.

$$-2x - 10 - 1 < 3x + 9$$

$$-2x \boxed{-11} < \boxed{3x} + 9$$

$$-2x - 3x < 9 + 11$$

$$-5x < 20$$

Divide by -5

$$\frac{-5}{-5}x > \frac{20}{-5}$$

$$\boxed{x > -4}$$

→ Set-Builder Notation

$$\{x \mid x > -4\}$$

Such that

Graph

Interval Notation $(-4, \infty)$

Solve, and use all three method to display
Your final ans.

$2x - 13 \geq 7(x+1) - 12$

$2x - 13 \geq 7x + 7 - 12$

$2x - 13 \geq 7x - 5$ $\boxed{x \leq -\frac{8}{5}}$

$2x - 7x \geq -5 + 13$ ① S.B.N. $\left\{ x \mid x \leq -\frac{8}{5} \right\}$

$-5x \geq 8$ ② Graph

Divide by -5
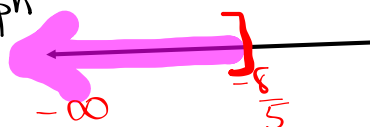
$\frac{-5}{-5} x \leq \frac{8}{-5}$ ③ I.N. $\left(-\infty, -\frac{8}{5} \right]$

You try:

$-2 < 5x + 8 \leq 43$

$-2 - 8 < 5x + 8 - 8 \leq 43 - 8$ ① S.B.N.

$-10 < 5x \leq 35$ $\left\{ x \mid -2 < x \leq 7 \right\}$

$\frac{-10}{5} < \frac{5}{5} x \leq \frac{35}{5}$ ② Graph

$\boxed{-2 < x \leq 7}$

③ I.N. $(-2, 7]$

The number of males at a meeting was 5 more than 3 times the number of females in that meeting. find how many of each if there were 37 at the meeting.

Total People = 37

Males + Females = 37

$3x+5$ + x = 37

Females → x

Males → $3x+5$

$= 3(8)+5$
$= 24+5$
$= 29$

8 Females
29 & Males

$4x+5=37$

$4x=32$

$\boxed{x=8}$

Mary has 42 Coins.
Dimes & Quarters only.

The number of quarters is 6 fewer than 3 times the number of dimes.

1) How many of each does she have?
2) How much money does she have?

Total # of Coins = 42

Dimes + Quarters = 42

Dimes → x

Quarters → $3x-6$

Dimes + Quarters = 42

x + $3x-6$ = 42

$4x = 48$

$\boxed{x=12}$

① 12 Dimes & 30 Quarters

② $12(10¢)+30(25¢)$

$= 120¢ + 750¢$

$= \boxed{870¢} = \boxed{\$8.70}$

School bought 19 tickets.

Price for adult was $12

"   "   Kid = $5

Adults + Kids = 19

The # of kids was 1 less than 4 times the # of adults.

Kids → $4x - 1$

Adults → x

1) find how many of each.

2) find total cost.

4 Adults & 15 kids

$x + 4x - 1 = 19$

$5x = 20$

$\boxed{x = 4}$

$4(\$12) + 15(\$5) = \$48 + \$75 = \boxed{\$123}$

The perimeter of a rectangular field is 106 meters.

The length is 1 meter shorter than twice its width.

1) Draw & label such field.

2) find its dimensions

3) find its area.

$w = x$ $P = 106\,m$

$L = 2x - 1$

18 m

$2(18) - 1$
$= 35\,m$

$P = 106$

$2L + 2W = 106$

$2(2x - 1) + 2(x) = 106$

$4x - 2 + 2x = 106$

$6x = 108$

$x = \frac{108}{6}$ $\boxed{x = 18}$

Dimensions: 18m by 35m

Area = LW
$= 18(35) = \boxed{630\,m^2}$

A rectangular room has a perimeter of 156 feet.

The width is 6 ft longer than half of its length.

1) Draw and label.

2) Find its dimensions

3) Find its area.

$P = 156$

$2L + 2W = 156$

$2X + 2\left(\frac{1}{2}X + 6\right) = 156$

$P = 156\ ft$

$W = \frac{1}{2}X + 6$

$L = X$

$2X + 2\cdot\frac{1}{2}X + 12 = 156$

$2X + X = 144$

$3X = 144$
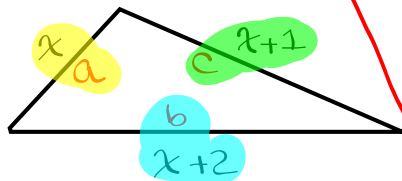
$X = 48$

Dimensions: 30 ft by 48 ft

$\frac{1}{2}(48) + 6 = 24 + 6 = 30\ ft$

48 ft

$A = LW$

$= 30(48) = 1440\ ft^2$

Three sides of a triangle are consecutive numbers. Its perimeter is 12cm.

Find the largest side.
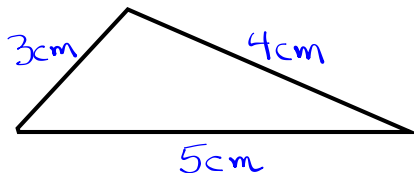
x a

c $x+1$

b

$x+2$

3cm   4cm

5cm

$P = 12$

$a + b + c = 12$

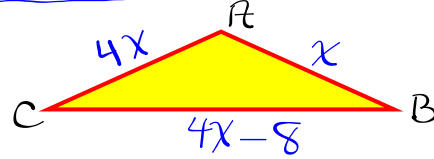$x + x+2 + x+1 = 12$

$3x + 3 = 12$

$3x = 9$

$x = 3$

5cm

5

Triangle ABC has a perimeter of 100 ft.

Side $\overline{AC}$ is 4 times Side $\overline{AB}$.

Side $\overline{BC}$ is (8 ft shorter than) Side $\overline{AC}$.

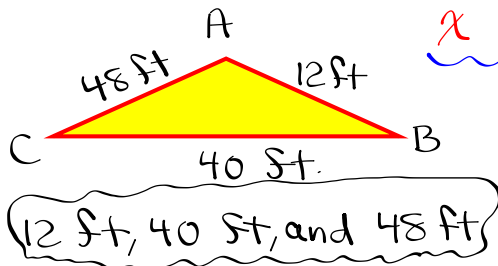1) Draw & label.

2) find all three sides.

$P = 100$

$\overline{AB} + \overline{AC} + \overline{BC} = 100$

$x + 4x + 4x - 8 = 100$

$9x - 8 = 100$

$9x = 108$

$x = 12$

48 ft A 12 ft
C 40 St. B

(12 ft, 40 St, and 48 ft)

Integers:

$0, 1, 2, 3, \ldots$

$-7, -6, -5, -4, \ldots$

$\ldots, -21, -20, -19, -18, \ldots, 14, 15, 16, \ldots$

Consecutive integers:

$27, 28, 29, \ldots$

$-13, -12, -11, \ldots$

$x, x+1, x+2, x+3, \ldots$

x must be an integer.

find two consecutive integers such that their sum is 61.

x & $x+1$

$x + x+1 = 61$

30 & 31

$2x + 1 = 61$

$2x = 60$

$x = \frac{60}{2}$ $x = 30$

---

find two consecutive integers such than the Sum of 3 times the Smaller one and twice the larger one is 87.

x & $x+1$

Smaller $\to x$
Larger $\to x+1$

17 & 18

$3 \cdot \text{Smaller} + 2 \cdot \text{larger} = 87$

$3 \cdot x + 2(x+1) = 87$

$3x + 2x + 2 = 87$

$5x = 85$

$x = 17$

find two consecutive integers such that the difference of the smaller one and 4 times the larger one is -103.

$\rightarrow x$ & $x+1$

Smaller $\rightarrow x$

Larger $\rightarrow x+1$

33 & 34

Smaller $- 4 \cdot$ Larger $= -103$

$x - 4(x+1) = -103$

$x - 4x - 4 = -103$

$-3x = -99$

$x = 33$

Consecutive even integers:

2, 4, 6, 8, - - - · · ·

90, 92, 94, 96, - - - ·

$-18, -16, -14, -12, -10, -$ · · ·

$x, x+2, x+4,$ - - - x must be even.

find two consecutive even integers Such that their sum is 154.

$\rightarrow x \ \& \ x+2$

$x + x+2 = 154$

$2x = 152$

$x = \frac{152}{2} \qquad x = 76$

76 & 78

---

find two consecutive even integers Such that 4 times the smaller one is equal to 402 less than the larger one.

$\rightarrow x \ \& \ x+2$

$\emptyset$

$4 \cdot \text{Smaller} = \text{Larger} - 402$

$4x = x+2 - 402$

$4x - x = -400$

$3x = -400$

$x = \frac{-400}{3}$

$x = -133.\overline{3}$

Not an integer

find two Consecutive even integers such that **5 times the smaller one** **is equal to** **554 more than** **the larger one.**

→ x & $x+2$

$5x = x+2 +554$

$5x - x = 556$

$4x = 556$ **odd**

$x = 139$

$\emptyset$ **Not even** →

Consecutive odd integers:

1, 3, 5, 7, - - - -

21, 23, 25, 27, - - - -

-99, -97, -95, -93, - - -

x, $x+2$, $x+4$, - - - x must be odd.

Find three consecutive odd integers such that their sum is 123. $\rightarrow x, x+2, x+4$

First + Second + Third = 123

$x + x+2 + x+4 = 123$

$3x + 6 = 123$

$3x = 117$

$\boxed{x = 39}$

(39, 41, and 43)

Find two consecutive odd integers such that 4 times the smaller one is equal to 151 more than the larger one.

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

(51 & 53)

$4 \cdot x = x+2 + 151$

$4x - x = 153$

$3x = 153 \qquad x = 51$

NO School → Monday
Exam 1: Tuesday
Due Tuesday at 6:00 AM: WP5 & WP6
Also work on SG 4, 5, 6, and 7.