Warmup:

c+40 c

The cost of two tables and three chairs is $705. If the table costs $40 more than the chair, find the cost of the table and the chair.

Let c = cost of a chair

Let c+40 = cost of a table

$$c+40+c+40+c+c+c = 705$$

$$5c+80 = 705$$

$$5c = 625$$

$$c = \$125$$

table = $165

$$3c + 2(c+40) = 705$$

$$3c + 2c + 80 = 705$$

$$5c + 80 = 705$$

Lucy's Task

key

1) The sum of 38 and twice a number is 124. Find the number.

let x = a #

$38 + 2x = 124$

$2x = 86$

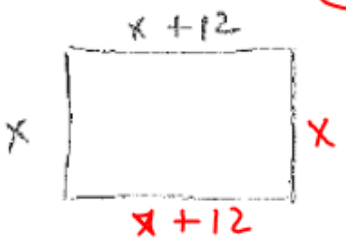
$x = 43$

$38 + 2(43)$

$38 + 86$

124 ✓

2) A rectangle is 12m longer than it is wide. Its perimeter is 68m. ~~Find its length and width.~~



let x = width x + 12 = length

$x + x + x + 12 + x + 12 = 68$

$4x + 24 = 68$

$4x = 44$

$x = 11$

width = 11

length = 23

11 + 11 + 23 + 23

68 ✓

~~Find width~~

Find length

$2(x) + 2(x+12) = 68$

$P = 2l + 2w$

let x = length

x − 12 = width

3) **Find three consecutive integers whose sum is 171.**

let x, $x+1$, $x+2$ be 3 consecutive integers

$x + x + 1 + x + 2 = 171$

$3x + 3 = 171$

$3x = 168$ $\quad x = 56$

56, 57, 58

$56 + 57 + 58 = 171$ ✓

4) Find four consecutive even integers whose sum is 244.

let $x, x+2, x+4, x+6$

$58, 60, 62, 64$

$x + x+2 + x+4 + x+6 = 244$

$58 + 60 + 62 + 64 = 244$ ✓

$4x + 12 = 244$

$4x = 232$

$x = 58$

four consecutive odd integers

x $x+2$ $x+4$ $x+6$

$x=3$ 5 7 9

E.Q.: How do I solve an inequality in one variable?

$> \quad <$

$\geq \quad \leq$

MGSE9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions.

MGSE9-12.A.REI.3 Solve linear equations and inequalities in one variable including equations with coefficients represented by letters. For example, given $ax + 3 = 7$, solve for x.

$5 > 3$

Solve for x:

$$2x + 3 < 7$$

$-3 \quad -3$

$$\frac{2x}{2} < \frac{4}{2}$$

$$x < 2$$

Solve for x:

$2(x + 3) \geq 8$

$2x + 6 \geq 8$

$-6 \quad -6$

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

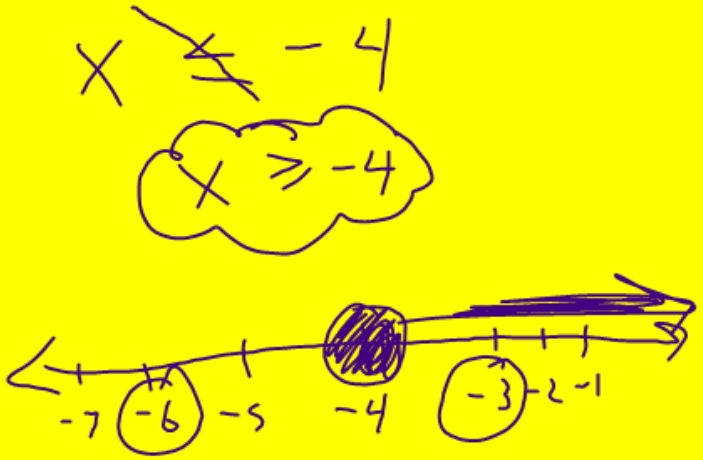
$x \geq 1$

Solve for x:

$$4 - 3x \leq 16$$

$x \leq -4$

$x \geq -4$



$4 - 3(-6) \leq 16$

$4 + 18$

$22 \leq 16$

$4 - 3(-3) \leq 16$

$4 + 9$

$13 \leq 16$

$4 - 3x \leq 16$

$-4 \quad -4$

$-3x \leq 12$

$\frac{-3x}{-3} \leq \frac{12}{-3}$

$x \geq -4$

$4 - 3x \leq 16$

$+3x \quad +3x$

$4 \leq 16 + 3x$

$-16 \quad -16$

$\frac{-12}{3} \leq \frac{3x}{3}$

$-4 \leq x$

$x \geq -4$

Rules for Solving Inequalities

- Whatever you do to one side of the inequality, you must do to the other side.
- Always get rid of the constant first and then any coefficients last.
- If you have fractions, get rid of the fractions first and then proceed with solving the inequality.

Difference between solving an equation and an inequality:

When solving an inequality, you must flip the inequality sign whenever multiplying or dividing by a negative number!!

Multiplication and Division Properties of Inequality

If $a > b$, then $ac > bc$, if $c > 0$

If $a > b$, then $ac < bc$, if $c < 0$

If $a > b$, then $\frac{a}{c} > \frac{b}{c}$, if $c > 0$

If $a > b$, then $\frac{a}{c} < \frac{b}{c}$, if $c < 0$

Solve for y:

$$\frac{-2y+3}{-4} < (-4.25)(-4)$$

$-2y+3 > 17$

$-3 \quad -3$

$\frac{-2y}{-2} > \frac{14}{-2}$

$y < -7$

$y > -7$

Writing 1 variable inequalities:

The sum of two consecutive integers is less than 83.
Find the pair of integers with the greatest sum.

Let x = one integer (40)

$x+1$ = next integer (41)

$$x + x+1 < 83$$

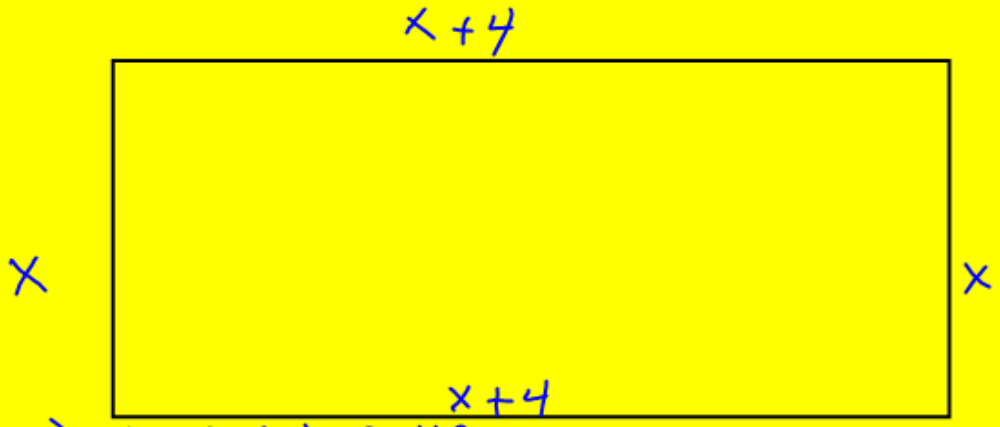
$$2x+1 < 83$$

$$\frac{2x}{2} < \frac{82}{2} \qquad x < 41$$

The length of a rectangle is 4 cm more than the width and the perimeter is at least 48 cm. What are the smallest possible dimensions for the rectangle?

Let x = width = 10

$x+4$ = length = 14



$2(x+4) + 2(x) \geq 48$

$x + x+4 + x + x+4 \geq 48$

$4x + 8 \geq 48$

$4x \geq 40$

$x \geq 10$

There are three exams in a marking period.
A student received grades of 75 and 81 on the first two exams.
What grade must the student earn on the last exam to get an average of no less than 80 for the marking period?

84 or higher

Let x = test 3

Avg. of 3 tests

$$\frac{\text{Test1} + \text{Test2} + \text{Test3}}{3} \geq 80$$

$$\frac{(75 + 81) + x}{3} \geq 80 \quad \star$$

$$3 \cdot \frac{156 + x}{3} \geq 80 \cdot 3$$

$$156 + x \geq 240$$
$$-156 \quad -156$$
$$x \geq 84$$

HW #3
One Variable Inequalities