Solving 2-Step Equations

1. + −
2. × ÷

We want to do the opposite

ex:

$$2x + 4 = 8$$
$$-4 \quad -4$$

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

$$x = 2$$

$$3x - 3 = 12$$
$$+3 \quad +3$$

$$\frac{3x}{3} = \frac{15}{3}$$

$$x = 5$$

ex:

$$\frac{x}{4} + 2 = 2$$
$$-2 \quad -2$$

$$(4)\frac{x}{4} = 0(4)$$

$$x = 0$$

ex:

$$\frac{x}{3} - 1 = 4$$
$$+1 \quad +1$$

$$(3)\frac{x}{3} = 5(3)$$

$$x = 15$$

Solving Uglier

1. Combine #'s and x's

   We can combine

   x's with x's

   #'s with #'s

2. + −

3. x ÷

   Do the opposite

ex:

$6p - 2 - 3p = 16$

$3p - 2 = 16$

$+2 \quad +2$

$\frac{3p}{3} = \frac{18}{3}$

$p = 6$

ex:

$-23 = -2a - 10 + a$

$-23 = -1a - 10$

$+10 \qquad +10$

$\frac{-13}{-1} = \frac{-1a}{-1}$

$13 = a$

Solving with ( )

1. Distribute
2. Combine stuff
3. + −
4. × ÷

ex:

$2(8+4c)=32$

$16+8c=32$

$-16 \quad -16$

$8c=16$

$\frac{8c}{8}=\frac{16}{8}$

$c=2$

ex:

$15=-2(2t-1)$

$15=-4t+2$

$-2 \quad -2$

$13=-4t$

$\frac{13}{-4}=\frac{-4t}{-4}$

$\frac{13}{-4}=t$

+

Solving with Fractions

We can multiply everything by the bottom to get rid of ~~parenthesis~~ fractions.

ex:

$$\frac{2}{5}\cdot\frac{(3)(5)}{} + \frac{3m}{5}\cdot\frac{(3)(5)}{} = \frac{31}{15}\cdot(3)(5)$$

$$10 + 9m = 31$$

$$-10 \qquad -10$$

$$\frac{9m}{9} = \frac{21}{9}$$

$$m = \frac{21}{9}$$

ex:

$$\frac{x}{3}\cdot\frac{(4)}{} - \frac{7x}{4}\cdot\frac{(3)(4)}{} = \frac{2}{3}\cdot(3)(4)$$

(3)(4)

$$4x - 7x = 8$$

$$\frac{-3x}{-3} = \frac{8}{-3}$$

$$x = \frac{8}{-3}$$

Solving with Variables on both sides

1. Combine if you can
2. Get the variable on one side
3. + -
4. × ÷

ex:

$5x - 1 = x + 15$

$-x \quad -x$

$4x - 1 = 15$

$+1 \quad +1$

$\frac{4x}{4} = \frac{16}{4}$

$x = 4$

ex:

$4p + 2 = 3p - 7$

$-3p \quad -3p$

$1p + 2 = -7$

$-2 \quad -2$

$p = -9$

Solving Proportions

Multiply by the bottoms and get rid of the fractions

~~Cross Multiply~~

bad

ex:

$$(8)\frac{g}{8}(5) = \frac{4}{5}(8)(5)$$

$$\frac{5g}{5} = \frac{32}{5}$$

$$g = \frac{32}{5}$$

ex:

$$(4)\frac{3}{4}(5) = \frac{x}{5}(4)(5)$$

$$\frac{15}{4} = \frac{4x}{4}$$

$$x = \frac{15}{4}$$

Sometimes they want you to solve for a variable.

ex:
Solve for n ← n by itself

$$\frac{PV}{rt} = \frac{n \cdot r \cdot t}{rt}$$

$$n = \frac{PV}{rt}$$

ex:
Solve for r

$$\frac{A}{\pi} = \frac{\pi \cdot r^2}{\pi}$$

$$\sqrt{\frac{A}{\pi}} = \sqrt{r^2}$$

$$r = \sqrt{\frac{A}{\pi}}$$

Literal Equations

Real world sort of equations.

Like anything in science class

ex: $PV = nrt$

Force = mass × acceleration

Area = πr^2

Other times they give you numbers and want to know what something equals.

ex:

The circumference is 22 what is the radius.

$C = 2\pi r$

$\frac{22}{2\pi} = \frac{2 \cdot \pi \cdot r}{2\pi}$

$r = \frac{11}{\pi}$

1. Plug in #'s

Continuous, Discrete, Domain and Range

Continuous

- Everything is connected

Discrete

- Dots, coordinates, tables

Continuous ex:

- speed
- weight
- time

Discrete ex:

- people
- books
- cars

Domain

All the numbers x can be

Range

All the numbers y can be

Continuous Domain

how far left $\leq x \leq$ how far right

Continuous Range

how far down $\leq y \leq$ how far up

Discrete Domain

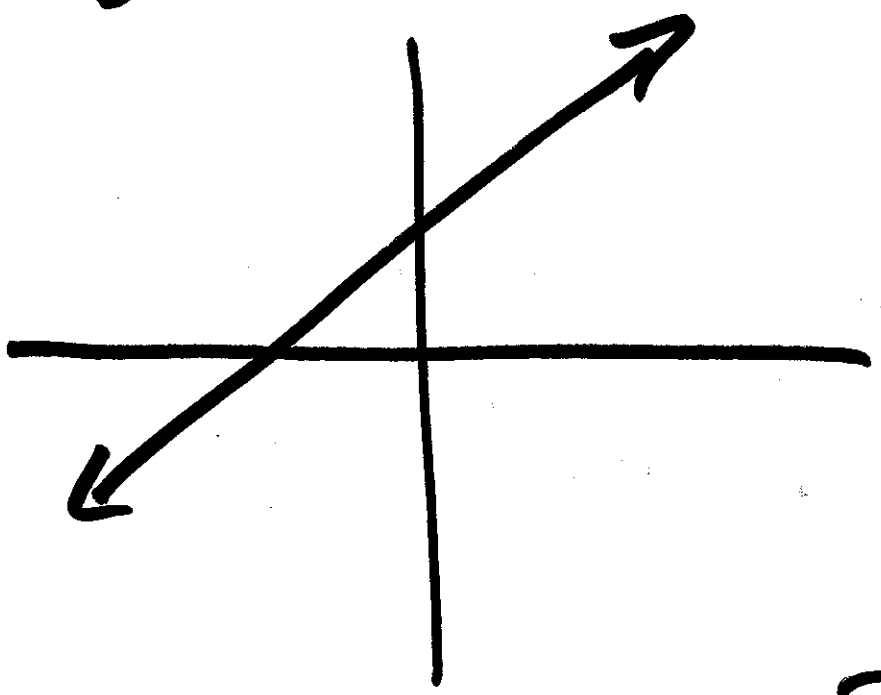
list out your x's

Discrete Range

list out your y's

ex:

$y = 2x + 3$



This goes all the way left, right, up, and down

so

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

$\mathbb{R}$ means all real numbers, so all of them.

ex:

x	y
1	6
2	8
3	10

Domain (x column) Range (y column)

D: 1, 2, 3

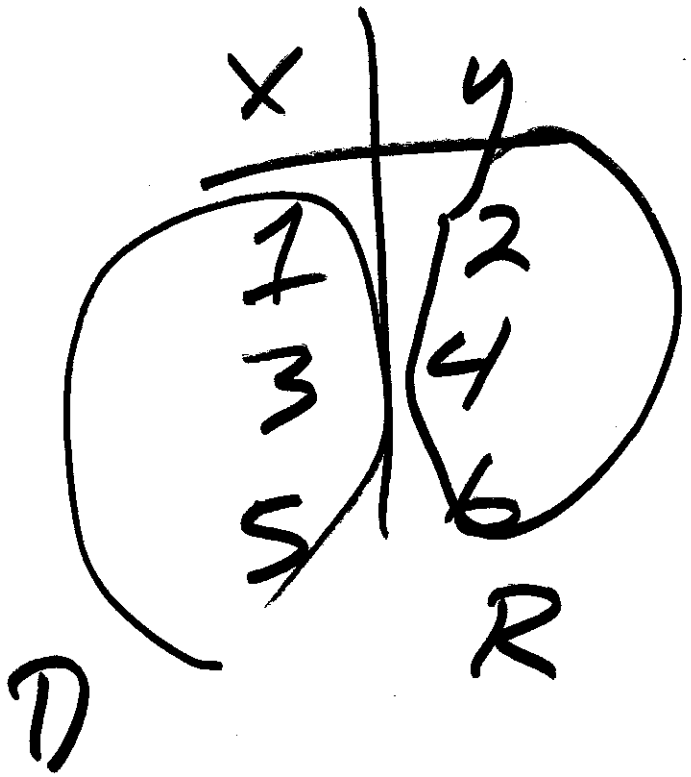
R: 6, 8, 10

ex:

$(1,2)(3,4)(5,6)$ (x,y)

Domain: 1, 3, 5

Range: 2, 4, 6



Domain and Range with word problems

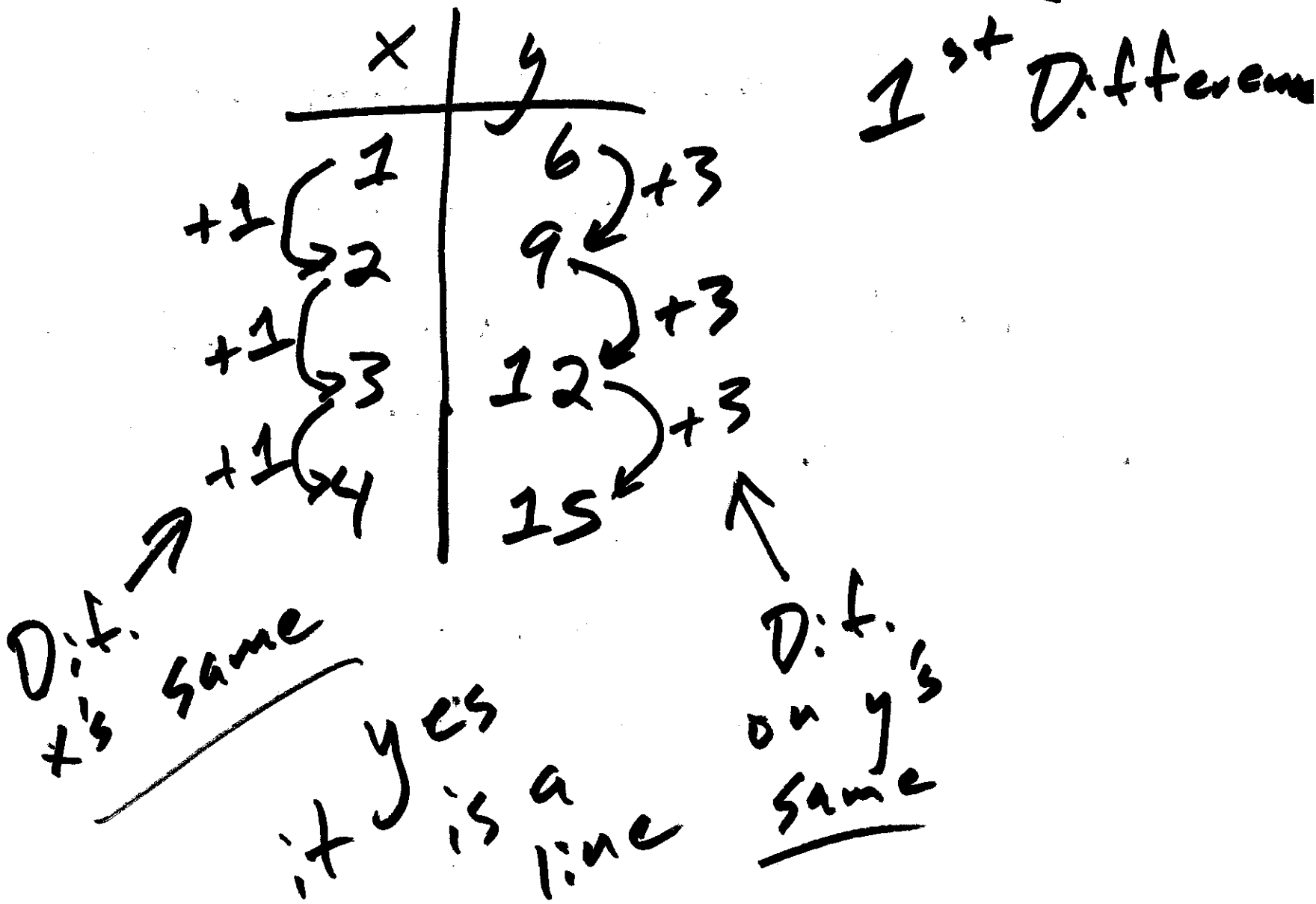
can we have negative people?

Can we be negative miles from the library?

Domain:
$0 \leq x$

Range:
$0 \leq y$

Is it a line?
Is it a function?



Is it a function?

With **tables, coordinates**:

→ x's can't repeat ←

x	y
1	5
2	6
2	7
4	8

not

x	y
1	5
2	5
3	5
4	5

yes

Is it a function?

With graphs:

Do the vertical line test.

Your line can only cross once.

More than once = not a function.