Agenda: June 7

- Linear Review

- Practice in Prep guide, review sheets & Extra Practice Finding the Rule (from Types of Representation Page)

Types of Representation Review

Linear relationships always have the rule
(straight lines)

$$y = pattern \cdot x + initial\ value$$
$$y = ax + b$$

y: dependent variable (y depends on x)

x: independent variable

pattern: rate at which the line is going up or down $\left(\dfrac{change\ in\ y}{change\ in\ x}\right)$

initial value: what y is when x=0, where the line starts from the y-axis

Remember → proportional situations $(y=ax)$ are straight lines with an initial value of __0__

we can find the rule in many different ways

From a scenario:

A fishing park charges a 25$ entrance fee
as well as 2$ per fish caught $y = 2x + 25$

X: #of fish caught   }   (y per x)
Y: total cost

pattern: 2 — key words: per, every, each, /
initial value: 25   — key words: fee, original amount, entrance cost

From a table of values:

x	0	1	2	3	4
y	18	15	12	9	6

+1   +1   +1   +1
-3   -3   -3   -3

initial value
y when x=0

pattern $= \dfrac{-3}{1}$

18

6
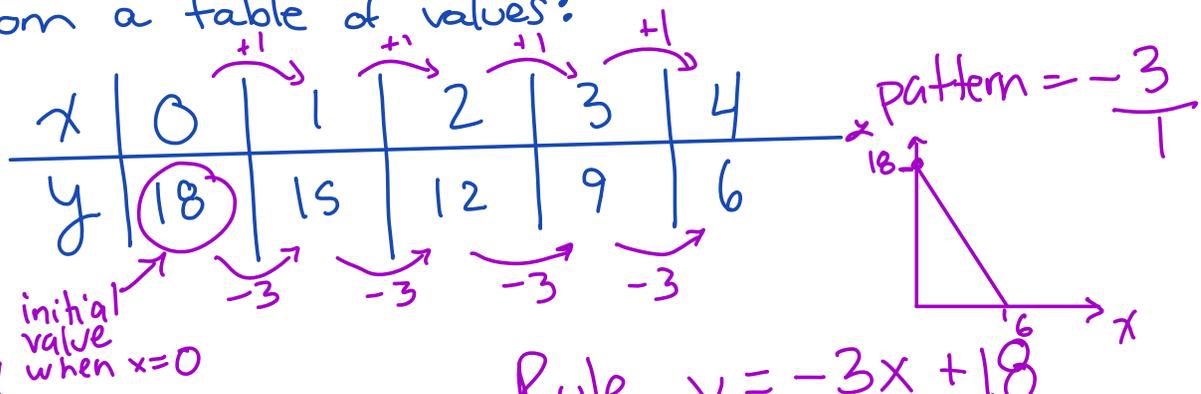
Rule $y = -3x + 18$

or when x does NOT go up by 1

Option 2 for initial value:

x	0	1	3	5	7
y	2	5	11	17	23

-1 $+2$ $+2$ $+2$

$+6$ $+6$ $+6$

-3

initial value ② → initial value

$\text{pattern} = \dfrac{\text{change in } y}{\text{change in } x} = \dfrac{6}{2} = 3$

$y = 3x + b$
we can plug a point in to solve for initial value (b)

$5 = 3(1) + b$
$5 = 3 + b$
$-3 \quad -3$
$2 = b$

initial value = go backwards in the table from Y
in x you go back by · pattern
$1 \cdot 3$

Rule $y = 3x + 2$

From a graph

Total cost for membership versus classes taken

(20, 40)

(10, 25)

initial value

(0, 10)

y: Total cost of yoga membership
x: Number of yoga classes taken
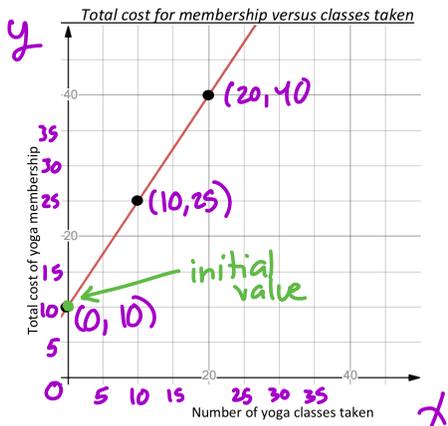
① Make a table of values with perfect points from the graph
★ pay attention to the scale of the axes

x	0	10	20
y	10	25	40

$+10$ $+10$
$+15$ $+15$

initial value is 10

$\text{Pattern} = \dfrac{15}{10} = 1.5$ $\left(\dfrac{\text{cost}}{\text{class}} \text{ cost per class} \right)$

Rule $\Rightarrow$ $y = 1.5x + 10$

Once we have the rule we can use it to solve
for missing information. $(y = 1.5x + 10)$

How much will it <u>cost</u> for 40 <u>yoga classes</u>?
$y = ?$ $x = 40$

$$y = 1.5x + 10$$
$$y = 1.5(40) + 10$$
$$y = 60 + 10 = 70$$

It will cost 70\$

How many <u>yoga classes</u> can you take for <u>56.50 \$</u>
$x = ?$ $y = 56.50$

$$y = 1.5x + 10$$
$$56.50 = 1.5x + 10$$
$$-10 -10$$
$$\frac{46.50}{1.5} = \frac{1.5x}{1.5}$$
$$31 = x$$

You can take 31 classes