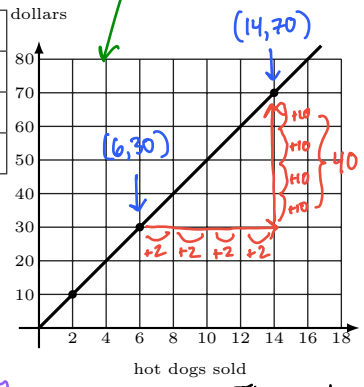
Artifact 12 – Calculating Slope and Rate of Change

Driving Question: From a table whose steps are not even, or from a graph, how do you find how much y changes for each 1 of x?

Example 1

A stadium cart clears the same amount on every hot dog.

Hot dogs	Dollars
2 x_1	10 y_1
6	30
14 x_2	70 y_2



proportional – passes through the origin

every $\frac{y}{x}$ is the same

$\frac{10}{2} = \frac{30}{6} = 5$ ✓

Slope of the line:

$\frac{\text{Change in } y}{\text{Change in } x} = \frac{40}{8} = 5$

– or –

x	y
x_1 6	30 y_1
x_2 14	70 y_2

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{70-30}{14-6} = \frac{40}{8} = 5$

– or – (use different pts)

$m = \frac{70-10}{14-2} = \frac{60}{12} = \boxed{5}$

Meaning in context:

The cart makes \$5 for every hot dog sold.

Example 2

proportional $\left(\frac{15}{2} = \frac{37.5}{5}\right)$

A dog walker charges the same amount for every dog.

Dogs	Dollars
2 x_1	15 y_1
5 x_2	37.50 y_2
9	67.50

Rate of change, dollars per dog. Show the two rows you used.

$m = \frac{37.50-15}{9-2} = \frac{22.5}{7} = 7.5$

Would two other rows give the same rate? Show it.

$\frac{37.5-15}{5-2} = \frac{22.5}{3} = 7.50$

Slope of the line

\$7.50/dog

Artifact 13 – Slope and y-Intercept

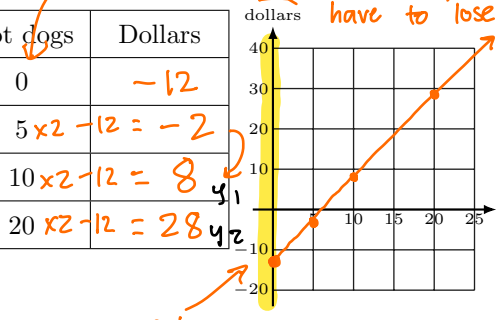
Driving Question: Where does a line cross the y-axis, and what does that point mean in a real situation?

Example 1

The rent cart from your board: 12 dollars of rent, then 2 dollars on every hot dog. Fill the table, plot the points, draw the line.

Before I sell any hot dogs, I have to lose \$12

Hot dogs	Dollars
0	−12
5 x2	−12 = −2
x_1 10 x2	−12 = 8 y_1
x_2 20 x2	−12 = 28 y_2



Where does the line start? Write it as a point.

(0, 12)

What does that point mean for the cart?

Before any hot dogs are sold, I am at −\$12.

Rate of change, and the slope

$\frac{28-8}{20-10} = \frac{20}{10} = 2$

\$2 per hot dog

↑ key word for slope

Example 2

A student saves the same amount every week. The table starts at week 4; fill in the weeks above it.

Weeks	Dollars
0	30
1	45
2	60
3	75
4 x_1	90 y_1
8 x_2	150 y_2
15	255

Slope / rate of change

Rate of change, dollars per week

$\frac{150-90}{8-4} = \frac{60}{4} = \$15$ saved per week

Work back from week 4, one week at a time, to week 0.

The y-intercept, as a point, and what it means

At 0 weeks (at the start), a student has \$30.

Notes to Forgetful Self

Rate of change, in my own words. From a table I take the difference in two y-values divided by the difference in two x-values of the same corresponding coordinates.

The y-intercept, in my own words. On a graph it is the point where the line intersects the y-axis (where $x=0$).