Mathematics 10C

Unit RF: Relations and functions

Characteristics of linear graphs

Where the line meets the axes

- The line passes through (0, 4) and (2, 0).
- It meets the y-axis at 4 and the x-axis at 2.

Features of a linear graph

- The slope between $(0, 4)$ and $(2, 0)$ is $(0 - 4)/(2 - 0) = -2$.
- A full line uses every real number as an input and as an output.

Key terms

x-intercept

The point where a graph meets the horizontal axis, so the output is 0. ((a, 0))

y-intercept

The point where a graph meets the vertical axis, so the input is 0. ((0, b))

domain

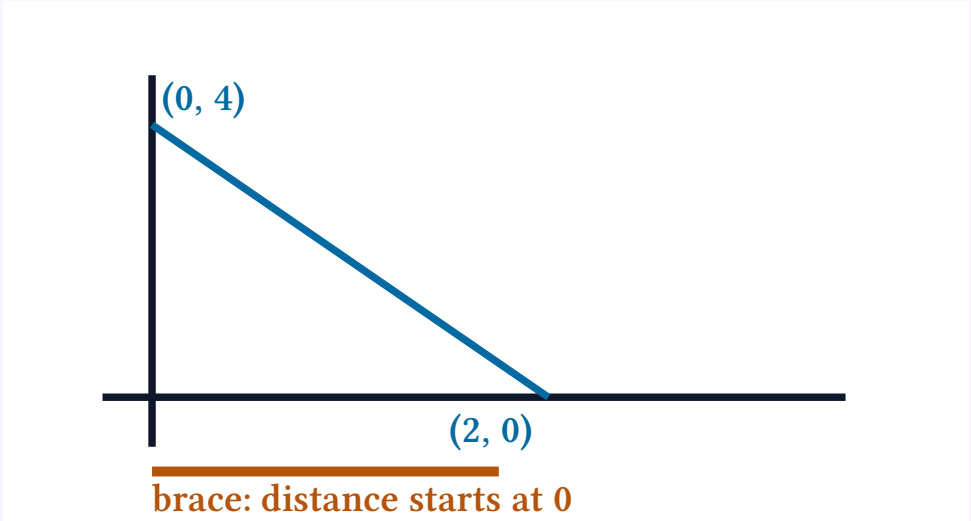
The set of inputs the relation uses, all real numbers for a full non-vertical line. (allowed x)

range

The set of outputs the relation uses, all real numbers for a full non-horizontal line. (allowed y)

Four features of the full line

- The y-intercept is (0, 4).
- The x-intercept is (2, 0).
- The slope is −2, and the domain and range are all real numbers.

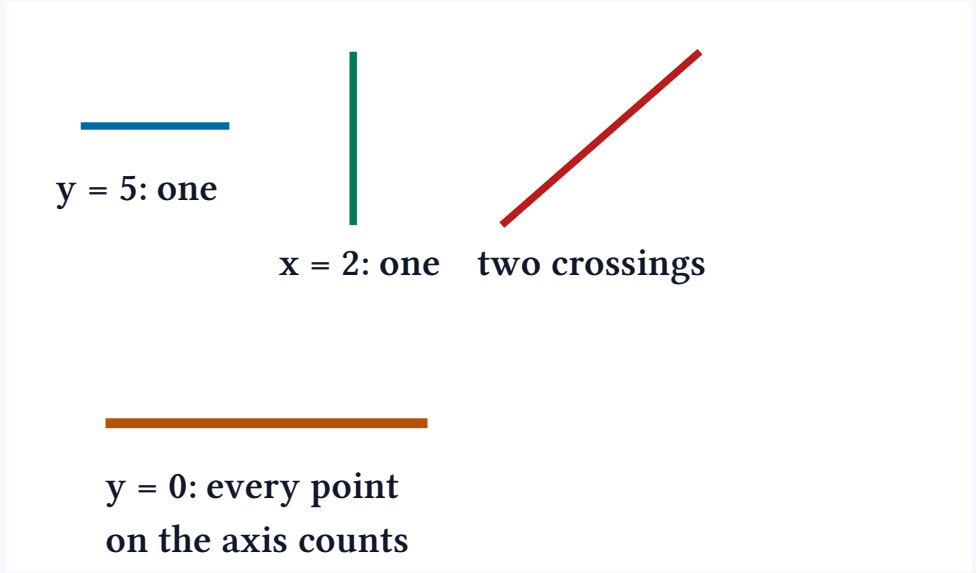


A phone bill

- The bill is $C = 0.10m + 20$ for $m \geq 0$.
- The y-intercept is (0, 20) and the slope is 0.10.
- The domain is $m \geq 0$ and the range is $C \geq 20$.

How many intercepts

- The line $y = x + 1$ meets the axes at $(0, 1)$ and $(-1, 0)$.
- The horizontal line $y = 3$ meets the y-axis once, at $(0, 3)$.
- The x-axis, $y = 0$, has every point on it as an x-intercept.



A ray of the fare

- With $x \geq 0$ and $y \geq 0$, the graph runs from $(0, 3)$ to $(3, 0)$.
- The domain is $0 \leq x \leq 3$ and the range is $0 \leq y \leq 3$.

Quick check

- The line through $(0, -1)$ and $(2, 3)$ has slope 2 and y-intercept -1.
- The bill $C = 0.10m + 20$ with $m \geq 0$ has range $C \geq 20$.

Reading four features

- Name the intercepts, then the slope.
- Then say whether a story cuts the domain or the range.