

## Section 1.1 Functions and Change

In this section we review function notation and linear functions

D, Date (Jan.'07)	9	10	11	12	13	14	15
T, High Temp (°F)	32	32	39	25	23	25	24

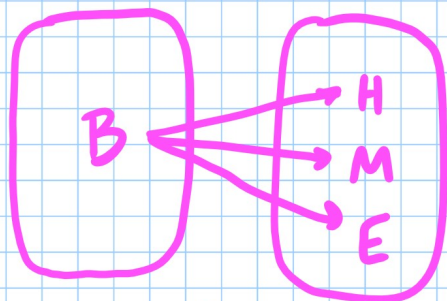
We say temperature,  $T$ , is a function of date,  $D$ .

The dates are inputs, or domain

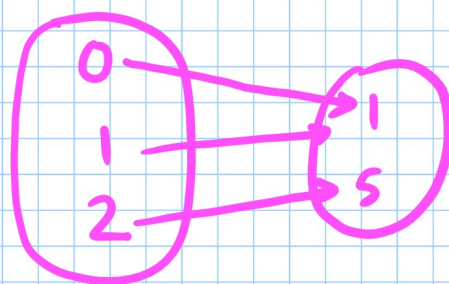
The high temps are outputs, or range

$$\begin{array}{c} \text{temp} \rightarrow T = f(D) \leftarrow \text{date} \\ \quad \quad \quad \uparrow \\ \quad \quad \quad \text{function of} \end{array}$$

Note that there is only one output for each input, making this a function.



not a function



is a function

We can represent functions using tables, graphs, description in words, or equations

In this section, we focus on linear functions

$$f(x) = mx + b \quad \text{where } m = \text{slope} \quad b = \text{y-intercept.}$$

$$D = (-\infty, \infty) \quad \mathbb{R}$$

If  $m \neq 0$  then  $R = (-\infty, \infty)$

If  $m = 0$ , then  $R = [b, b]$

↑ horizontal

ex:  $(-2, 1)$  and  $(2, 3)$

Find eq of line through these two points

Find slope,  $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 1}{2 - (-2)} = \frac{2}{4} = \frac{1}{2}$

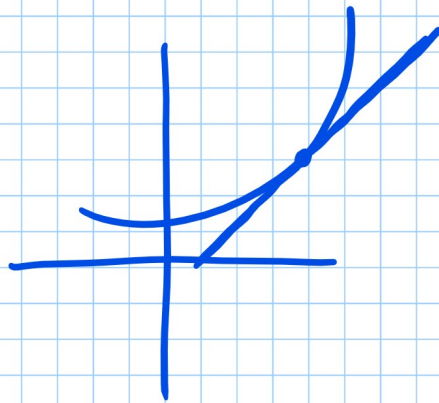
$$y = mx + b$$

$$3 = \frac{1}{2} \cdot 2 + b$$

$$3 = 1 + b$$

$$2 = b$$

$$y = \frac{1}{2}x + 2$$



Find slope and y-int. of

$$\begin{array}{r} -4y + 2x + 8 = 0 \\ +4y \qquad \qquad +4y \\ \hline \end{array}$$

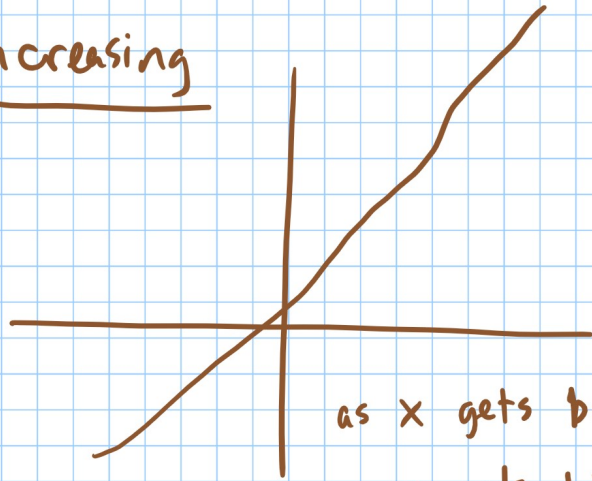
$$2x + 8 = 4y$$

$$\frac{2x}{4} + \frac{8}{4} = y$$

$$y = \frac{1}{2}x + 2$$

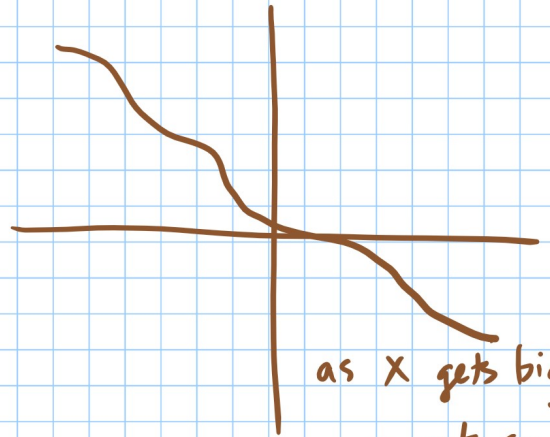
$$m = \frac{1}{2} \quad b = 2$$

Increasing

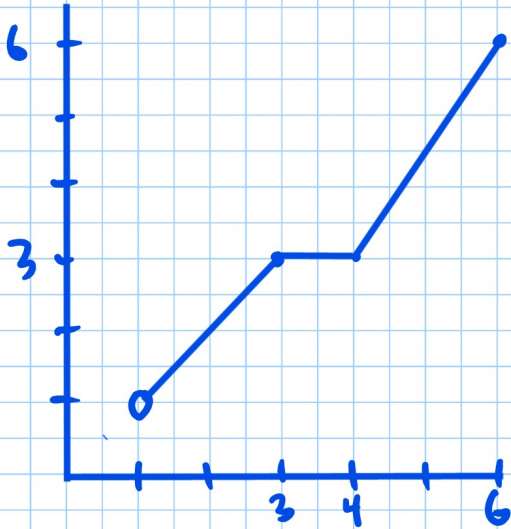


as x gets bigger  
y gets bigger

Decreasing



as x gets bigger  
y gets smaller



$$D = (1, 6]$$

$$R = (1, 6]$$

increasing on  
(1, 3) and (4, 6)

constant on (3, 4)

Assignment: p 7-8 1, 4, 5, 9, 11, 14, 17, 27, 31

Books put back  
Calculators put away

31)  $\begin{matrix} x & y \\ (1000, 90) \\ (1600, 105) \end{matrix}$

a)  $m = \frac{105 - 90}{1600 - 1000} = \frac{15}{600 \text{ ft}^3} = 0.025 \frac{\$}{\text{ft}^3}$

11)  $y = 5x - 3$

$\uparrow m = 5$

$\perp$  has  $m = -\frac{1}{5}$

$(2, 1)$

$1 = -\frac{1}{5} \cdot 2 + b$

$1 = -\frac{2}{5} + b$

$\frac{7}{5} = b$

$y = -\frac{1}{5}x + \frac{7}{5}$

$$b) \quad y = .025x + b$$

$$90 = .025(1000) + b$$

$$90 = 25 + b$$

$$65 = b$$

$$y = .025x + 65$$

$$c) \quad 130 = .025x + 65$$

$$65 = .025x$$

$$2600 \text{ ft}^3 = x$$