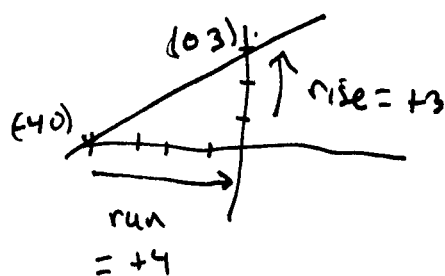


2.5 Equations of Lines

22) Given: A line has x-intercept $(-4, 0)$
and y-intercept $(0, 3)$.

Find slope-intercept form of the line.



so $m = \frac{3}{4}$ OR

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 0}{0 - (-4)} = \frac{3}{4}$$

$$\boxed{y = \frac{3}{4}x + 3}$$

30) Given: slope $= -2$, line passes through $(4, -7)$

$$y = mx + b \quad \text{and} \quad m = -2 \text{ so}$$

$$y = -2x + b \quad \text{what is } b?$$

Use that $(x, y) = (4, -7)$ satisfies the equation

$$-7 = -2(4) + b \quad \text{is a true equation}$$

$$-7 = -8 + b \quad \text{so } b = -7 + 8 = 1$$

$$\boxed{y = -2x + 1}$$

OR use point-slope form: $y + 7 = -2(x - 4)$

$$\Rightarrow y + 7 = -2x + 8 \Rightarrow \boxed{y = -2x + 1}$$

(2)

52) Find (a) standard form and (b) slope-intercept form
for a line through $(3, -2)$ parallel to $2x - y = 5$.

[Recall: Two lines are parallel if their slopes are equal.]

Given line: $2x - y = 5$ has slope 2 because

the equation in slope-intercept form is

$$-y = -2x + 5 \text{ so}$$

$$y = 2x - 5$$

↖ slope = 2

Desired line: $y + 2 = 2(x - 3)$

$$\uparrow$$

$$y - (-2)$$

$$\Rightarrow y + 2 = 2x - 6$$

$$\Rightarrow y + 8 = 2x$$

$$\Rightarrow \boxed{2x - y = 8} \leftarrow \begin{array}{l} \text{[other} \\ \text{answers} \\ \text{are} \\ \text{possible}] \end{array}$$

$$\Rightarrow -y = -2x + 8$$

$$\Rightarrow \boxed{y = 2x - 8} \leftarrow \begin{array}{l} \text{Standard} \\ \text{equation} \end{array}$$

↖ slope-intercept.

(3)

54) [same]

Through $(-2, 0)$ perpendicular to $8x - 3y = 7$

Given line has slope (what?).

$$8x = 3y + 7$$

$$8x - 7 = 3y$$

$$\text{Given line: } m_1 = \frac{8}{3}$$

$$y = \frac{8}{3}x - \frac{7}{3}$$

$$\text{Desired line: } m_2 = -\frac{3}{8}$$

$$y = -\frac{3}{8}(x + 2) \quad \leftarrow \text{pt-slope}$$

$$\boxed{y = -\frac{3}{8}x - \frac{3}{4}} \quad \leftarrow \text{slope-intercept}$$

$$8y = -3x - 6$$

$$\boxed{3x + 8y = -6} \quad \leftarrow \text{standard form}$$

62)

x	year	cost (dollars)
x=0	2009	6312
x=2	2011	7136

Find a linear equation interpolating these points

$$m = \frac{\text{rise}}{\text{run}} = \frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{x_2 - x_1} = \frac{7136 - 6312}{2 - 0} = \frac{824 \text{ dollars}}{2 \text{ years}} = 412 \text{ dollars/year}$$

a)

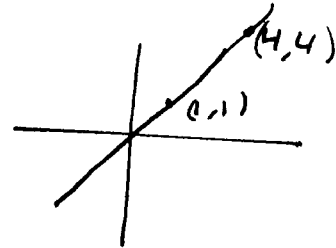
$$\boxed{f(x) = y = 412x + 6312}$$

b) In 2013, $x=4$ and $f(4) = 412(4) + 6312 = \boxed{7,960 \text{ dollars}}$

2.6 Graphs of Basic Functions [See the textbook for better-looking graphs]

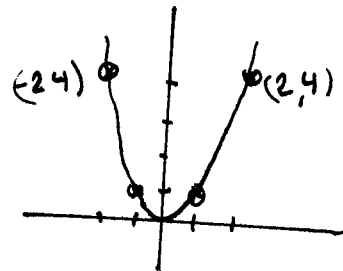
Be familiar with these functions:

Identity function: $f(x) = x$



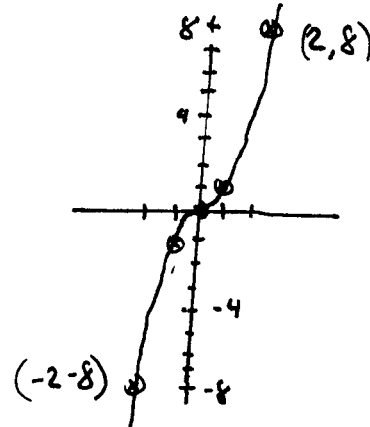
Squaring function: $f(x) = x^2$

x	x^2
-2	4
-1	1
0	0
1	1
2	4
3	9



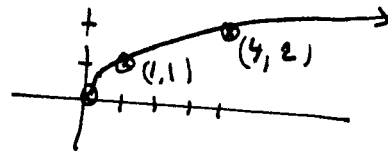
Cubing function: $f(x) = x^3$

x	x^3
-2	-8
-1	-1
0	0
1	1
2	8



Square root: $f(x) = \sqrt{x}$

x	$\sqrt{x}$
0	0
1	1
4	2
9	3
16	4



See also: cube root: $f(x) = \sqrt[3]{x}$

absolute value: $f(x) = |x|$

piecewise-defined functions: (various) example: $f(x) = \begin{cases} 2x+3 & \text{if } x \leq 0 \\ -x^2+3 & \text{if } x > 0 \end{cases}$