

# 2.4 Linear Functions

Day 2

10

**Ex 4** Graph  $4x - 5y = 20$  Give Domain & Range

y-intercept,  $x=0$

x-intercept,  $y=0$

$$x=0: 4(\cancel{0}) - 5y = 20$$

$$-5y = \frac{20}{-5}$$

$(0, -4)$

$$y = -4$$

$$y=0: 4x - 5(\cancel{0}) = 20$$

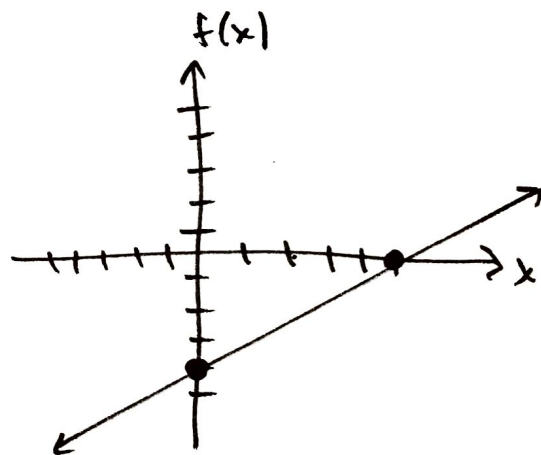
$$\frac{4x}{4} = \frac{20}{4}$$

$(5, 0)$

$$x = 5$$

x	y
0	-4
5	0


$$4x - 5y = 20$$




Domain:  $(-\infty, \infty)$


Range:  $(-\infty, \infty)$


Slope:

 positive

 negative

$$\frac{\text{Rise}}{\text{Run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x} = \frac{\text{change in } y}{\text{change in } x}$$

 slope = 0  
horizontal

 slope = undefined  
vertical

2.4

**Ex 5**

Find the slope of the line through the given points

Day 2

(2)

$$(a) \begin{matrix} x_1 & y_1 & & x_2 & y_2 \\ (-4, 8) & & (2, -3) \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 8}{2 - (-4)} = \frac{-11}{2 + 4} = \boxed{\frac{-11}{6}}$$

$$(b) (2, 7) (2, -4)$$

$$m = \frac{-4 - 7}{2 - 2} = \frac{-11}{0} = \boxed{\text{Undefined, vertical}}$$

$$(c) (5, -3) (-2, -3)$$

$$m = \frac{-3 - (-3)}{-2 - 5} = \frac{-3 + 3}{-7} = \frac{0}{-7} = \boxed{0, \text{Horizontal}}$$

**Ex 8**

In 2009 Google spent \$2800 million on R+D.

In 2013 Google spent \$8000 million on R+D

$$\text{Average Rate of Change} = \frac{8000 - 2800}{2013 - 2009} = \frac{5200}{4} = \boxed{1300}$$

Annual amount of money spent by Google on R+D increased by an average of \$1300 million each year from 2009 to 2013.