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Function Example

The average daily income of a physical therapist
can be modeled by the function

$$f(c) = 25c - 18$$

where c is the number of daily customers. Assume that no more than 10 customers can be seen in one day. Determine a reasonable domain and range for f(c) and calculate f(8).

Domain: What values make sense for c (# customers)?

0, 1, 2, 3 ... 10 $0 \le c \le 10$ c = whole #

Range: What values make sense for f(c) (income)?

$f(c) \ge -18$ $f(c) \le 232$

$-18 \le f(c) \le 232$

$f(8) = 25(8) - 18$

$= 200 - 18$

$= 182$

If they had 8 customers, income is $182.

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Slope

Slope (m): (x_1, y_1) (x_2, y_2)

delta means "change in"

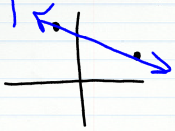
$\frac{\text{Rise}}{\text{Run}}$ or $\frac{y_2 - y_1}{x_2 - x_1}$ or $\frac{\Delta y}{\Delta x}$

$\frac{\text{vertical change}}{\text{horizontal change}}$

Example:

x_1, y_1 $(8, 3)$ x_2, y_2 $(-2, 7)$

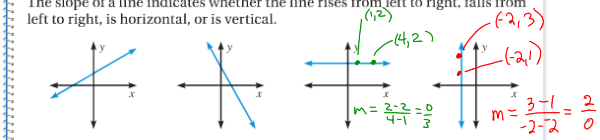
$m = \frac{7-3}{-2-8} = \frac{4}{-10} = -\frac{2}{5}$



KEY CONCEPT *For Your Notebook*

Classification of Lines by Slope

The slope of a line indicates whether the line rises from left to right, falls from left to right, is horizontal, or is vertical.



Positive slope	Negative slope	Zero slope	Undefined slope
Rises from left to right	Falls from left to right	Horizontal	Vertical

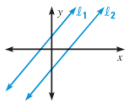
KEY CONCEPT *For Your Notebook*

Slopes of Parallel and Perpendicular Lines

Consider two different nonvertical lines ℓ_1 and ℓ_2 with slopes m_1 and m_2.

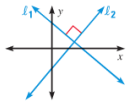
Parallel Lines The lines are parallel if and only if they have the same slope.

$m_1 = m_2$



Perpendicular Lines The lines are perpendicular if and only if their slopes are ~~negative~~ of each other.

$m_1 = -\frac{1}{m_2}$, or $m_1 m_2 = -1$



Suppose $m_1 = \frac{2}{5}$ then $m_2 = -\frac{5}{2}$

$m_1 = -4$ then $m_2 = \frac{1}{4}$ $(m_1 \cdot m_2 = -4 \cdot \frac{1}{4} = -1)$