Foundations of Math & Pre-Calculus 10
Lesson 5.7 ~ Interpreting Graphs of Linear Functions

A linear function is the graph of any line that is not vertical. The horizontal intercept is the point where a graph crosses the \( x \)-axis. The vertical intercept is the point where a graph crosses the \( y \)-axis.

Example #1: This graph shows how the height of a burning candle changes with time.

![Graph of a Burning Candle](image)

Height of a Burning Candle

- **a)** What is the horizontal intercept? What does this represent?
  
  \((45, 0)\) → candle burns for a total of 45 min.

- **b)** What is the vertical intercept? What does this represent?
  
  \((0, 10)\) → candle is originally 10 cm tall

- **c)** What are the domain and range?
  
  \[ d: \quad 0 \leq t \leq 45 \]
  \[ r: \quad 0 \leq h \leq 10 \]

Example #2: Sketch a graph of the linear function \( f(x) = 4x - 3 \) by finding the \( x \)-intercept and \( y \)-intercept.

- **\( x \)-intercept**: \( y = 0 \)
  
  \[
  0 = 4x - 3
  \]
  
  \[
  +3 \quad +3
  \]
  
  \[
  \frac{3}{4} = \frac{4x}{4}
  \]
  
  \[
  0.75 = x
  \]

- **\( y \)-intercept**: \( x = 0 \)
  
  \[
  y = 4(0) - 3
  \]
  
  \[
  y = -3
  \]
Example #3: Which graph has a rate of change of \(-5\) and a vertical intercept of 100? Justify your answer.

\[
\text{rate of change} = -\frac{100}{20} = -5
\]

\[
\text{rate of change} = \frac{50}{10} = 5
\]

* both graphs have a y-intercept of 100.

Example #4: This graph shows the total cost for a house call by an electrician for up to 6 h work. The electrician charges $190 to complete a job. For how many hours did she work?

Cost of an Electrician’s House Call

\[
\text{rate of change} = \frac{120}{3} = 40/\text{hr}
\]

\[C = 60 + 40t\]

\[
190 = 60 + 40t
-60 = -60
130 = 40t
\frac{130}{40} = t
3.25 = t\]