

▣ homework check: Walk this Way

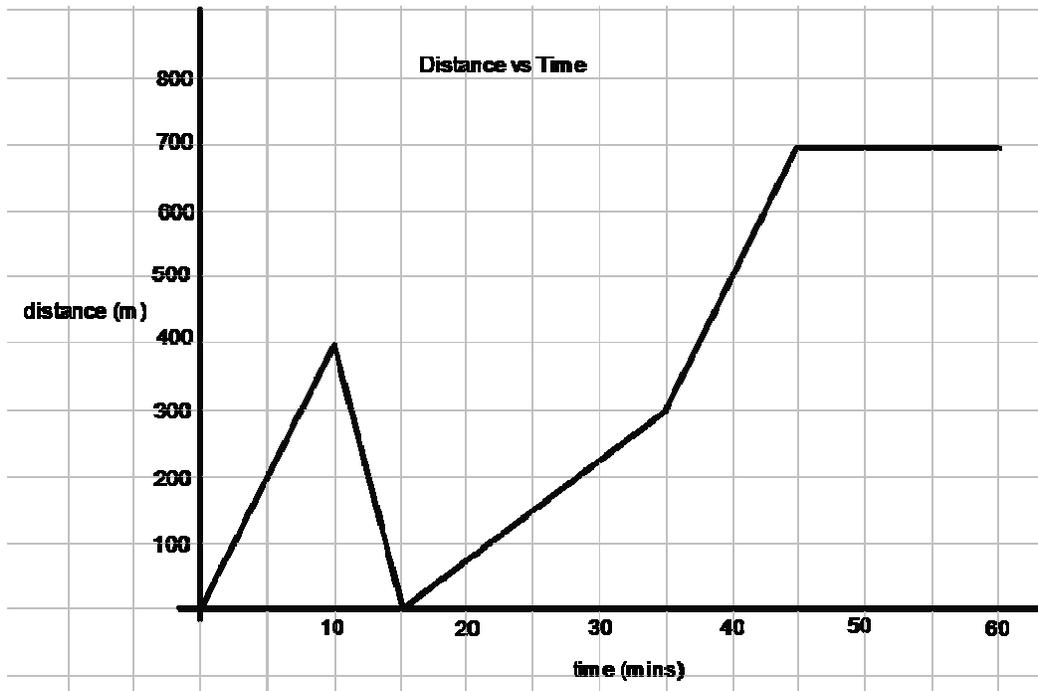
▣ note: Describing Situations from Graphs

In any graph describing movement, whether distance, height, or depth, versus time, the graph shows displacement. Time is always the independent variable making displacement the dependent variable. The rate of change in displacement relationships is the speed or velocity which can be calculated using slope. In all linear relationships, the speed or velocity is constant. In a non-linear relationship, the speed or velocity changes with time. (It is possible to find an instantaneous rate of change in a non-linear relationship, but is not the focus of our course.)

If the speed or velocity relationship is represented by a rising line or positive slope, the displacement increases as time increases. A falling line or negative slope represents displacement decreasing as time increases. Similarly, if the line is horizontal, there is no change in displacement as time increases.

Recall, to calculate the slope of a line, we use $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$.

Describe the movements in the following graph.



In this particular distance vs time graph,

Portion 1: the subject moves away from the starting position for 10 minutes and covers 400m at a speed of $speed = \frac{400}{10} = 40m / \text{min}$

Portion 2: the subject turns and returns to starting position covering 400m in 5 minutes at a speed of $speed = \frac{400}{5} = 80m / \text{min}$

Portion 3: the subject turns and moves away from starting again covering 300m in 20 minutes at a speed of $speed = \frac{300}{20} = 15m / \text{min}$

Portion 4: the subject continues to move away from starting position covering 400m in 10 minutes, the same speed as in portion 1 of $speed = \frac{400}{10} = 40m / \text{min}$

Portion 5: the subject stops moving once he is 700 m from starting position and stays for 15 minutes showing a speed of 0m/min.

■ homework assignment: NPM 9 p. 368 # 1, 2, 6 – 10, 14