5.4 – Slope as a Rate of Change Worksheet

MPM1D

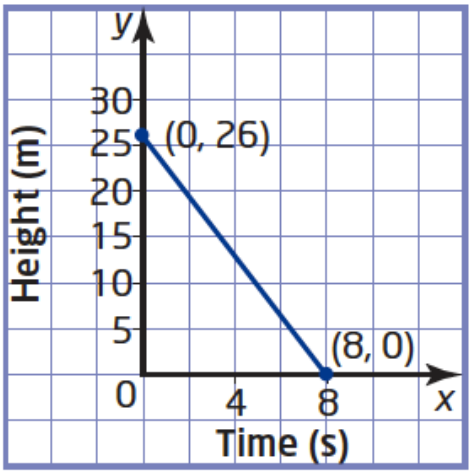
1. The average adult breathes in about 37 L of air every 5 minutes. What is the rate of change of volume of air?

2. A teenager's heart pumps an average of 7200 L of blood every 24 hours. What is the rate of change of volume of blood?

3. A hummingbird can flap its wings an average of 1800 times every 30 seconds. What is the rate of change of wing flaps?

4. The graph shows the height above the ground of a rock climber over time.

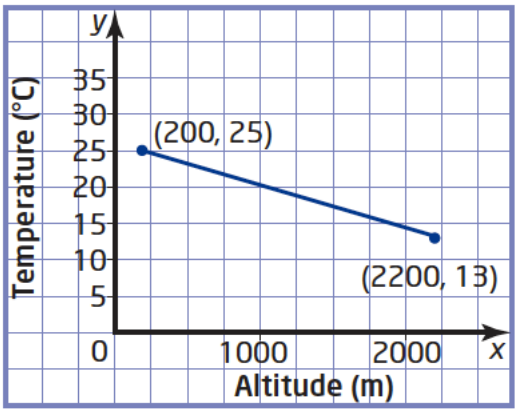
a) Calculate the slope of the graph.



b) Interpret the slope as a rate of change.

5. The graph shows the relationship between temperature and altitude.

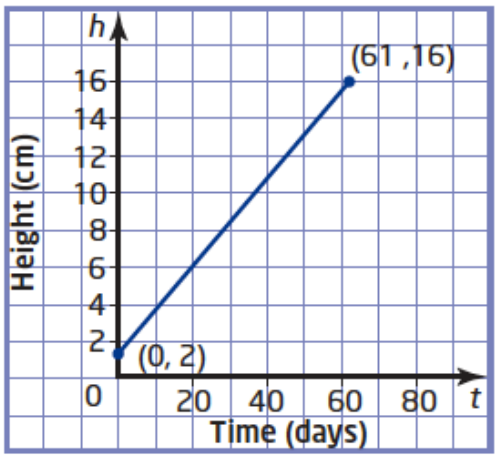
a) Calculate the slope of the graph.



b) Interpret the slope as a rate of change.

6. The price of a loaf of bread increased from $1.45 in 2003 to $1.78 in 2006. What is the average price increase per year?

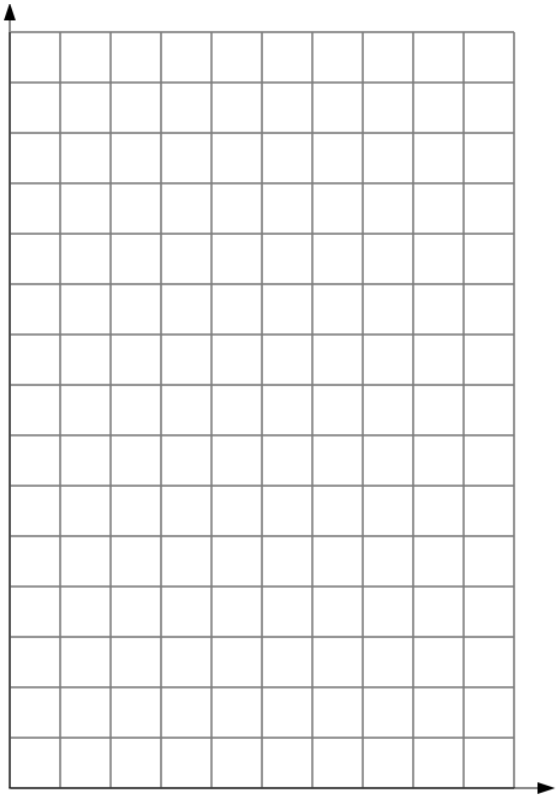
7. The graph shows the height of a plant over a 2-month growth period. Calculate the rate of change per day.



8. The table shows the minimum volume of water needed to fight a typical fire in rooms of various sizes.

Floor Area (m^2)	Minimum Volume of Water (L)
25	39
50	78
75	117

a) Graph the data in the table.

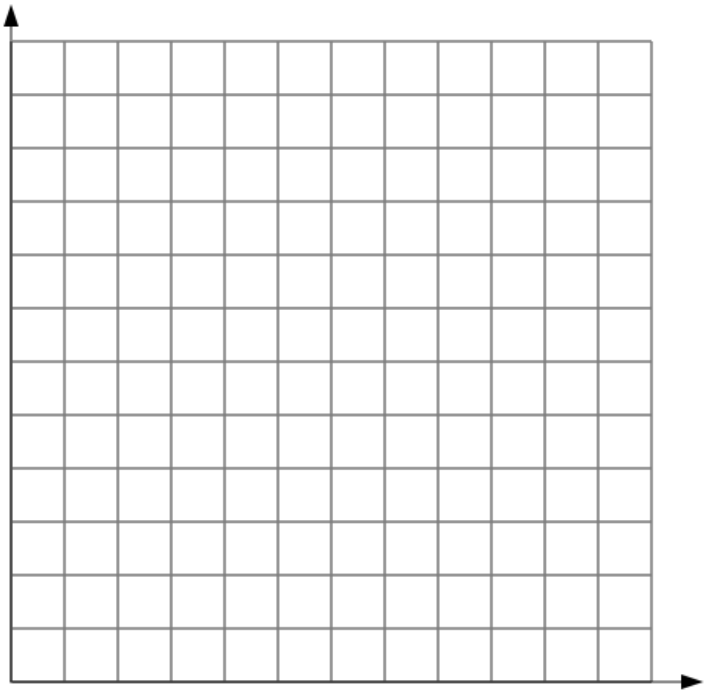


b) Calculate the rate of change.

c) If a fire truck is pumping water at a rate of 200 L/min, how long will it take to put out a fire in a room with a floor area of 140 m^2 ?

9. A large party balloon is being filled with helium at a constant rate. After 8 seconds, there is 2.5 L of helium in the balloon.

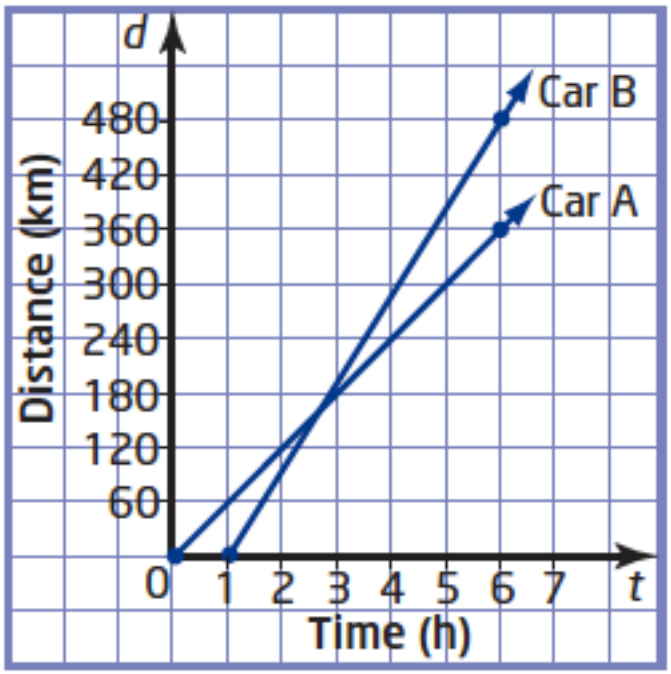
a) Graph this relation



b) The balloon will burst if there is more than 10 L of helium in it. How long will it take to fill the balloon with that much helium? Mark this point on your graph.

10. The distance-time graph shows two cars that are travelling at the same time.

a) Which car has the greater speed, and by how much?



b) What does the point of intersection of the two lines represent?

11. A scuba tank holds 2.6 m^3 of compressed air. A diver at a shallow depth uses about 0.002 m^3 per breath and takes about 15 breaths per minute.

a) How much air will the diver use in 1 minute?

b) How long will the air in the tank last at this rate?