

## 6.2 Interpreting Graphs

Prescribed Learning Outcomes (PLO'S):

- Extend a given graph (extrapolate) to determine the value of an unknown element
- Interpolate the approximate value of one variable on a given graph given the value of the other variable
- Extrapolate the approximate value of one variable from a given graph given the value of the other variable
- Solve a given problem by graphing a linear relation and analysing the graph

### Terminology

**Dependent Variable:** graphed on the vertical axis; e.g. cost

**Independent Variable:** graphed on the horizontal axis; e.g. time,

**Interpolate:** estimate a value between two given values

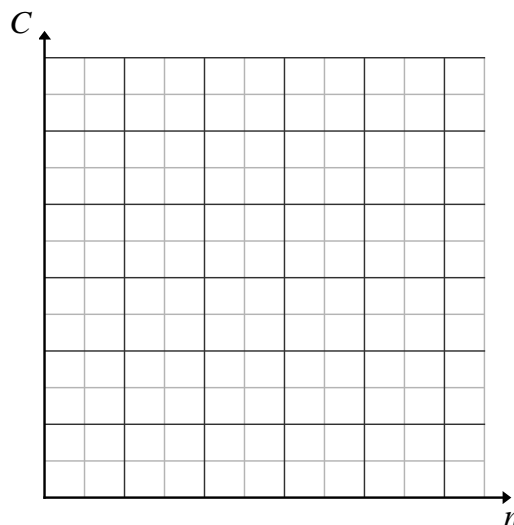
**Extrapolate:** estimate a value beyond a given set of values

**Slope:** describes the steepness of a line

**y-intercept:** Where the graph crosses the y-axis. The x-coordinate is zero

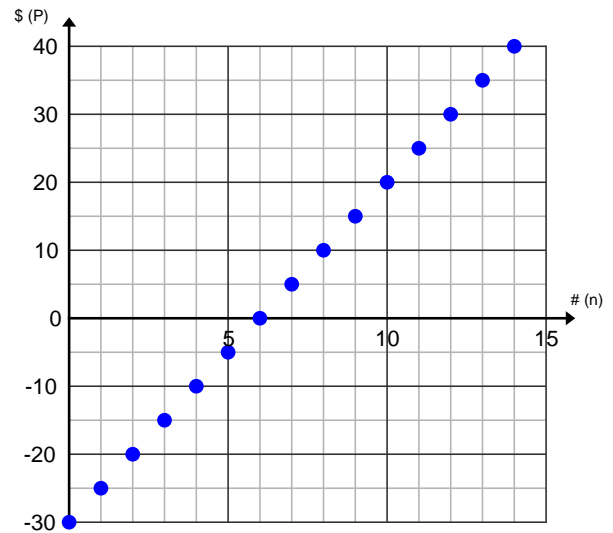
**Example 1:** Joseph is considering two different payment plans for his gym membership. Plan A charges a flat fee of \$45.00 each month. Plan B charges a flat fee of \$25.00 each month plus \$2.50 per visit.

- Make a table for each plan to show the monthly cost for 1, 2, 3 & 4 visits per month. Use  $C$  to represent cost and  $n$  to represent the number of visits.
- Write a linear relation to represent the cost per month of each plan.
- Graph the two linear relations.
- Does it make sense to connect the points on the graphs? Explain.
- Use the graph to help you identify the number of visits required for the two plans to have the same cost.
- If Joseph planned to visit the gym 10 times per month, which plan would cost less? How much less would it cost him?



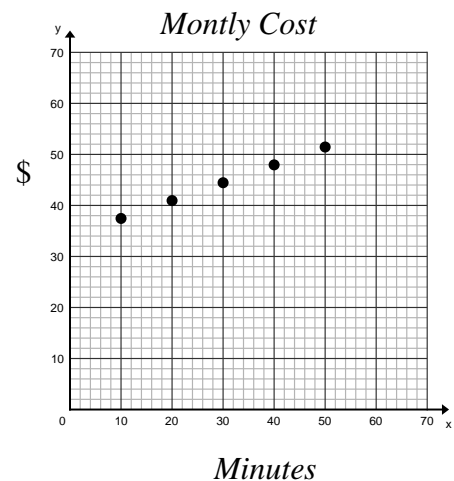
**Example 2:** The graph below represents Sally's daily Profit at her pie shop. The horizontal axis represents the number of pies sold and the vertical axis represents the Profit in dollars.

- How many pies must Sally sell in one day to break even?
- If Sally has made a profit of \$15, how many pies has she sold?
- How much profit does Sally make on each pie?
- What does the y-intercept of -30 mean?
- Write a linear equation to represent the graph.
- If Sally sells 50 pies in one day, what will the profit be?
- Could the points be connected in this graph? What assumptions are you making?



**Example 3:** A cell phone company charges a \$33.95 monthly fee and long distance charges at a rate of \$0.35 per minute. The graph shows the monthly cost of cell phone calls based on the number of long distance minutes.

- Interpolate the monthly cost for 35 minutes of long distance calling.
- Extrapolate the monthly cost for 60 minutes of long distance calls.
- Approximately how many minutes of long distance calls could you make for \$50 a month?
- Write an equation to represent the graph and use to check your answers to a, b & c.
- Could the points be connected in this graph? What assumptions are you making?



## 6.2 Review

1. The temperature in degrees Celsius ( $T$ ) in Port Coquitlam, on July 1, 2010 could be approximated by  $T = -1.2h + 25$ , where  $h$  is the number of hours since 6 pm.

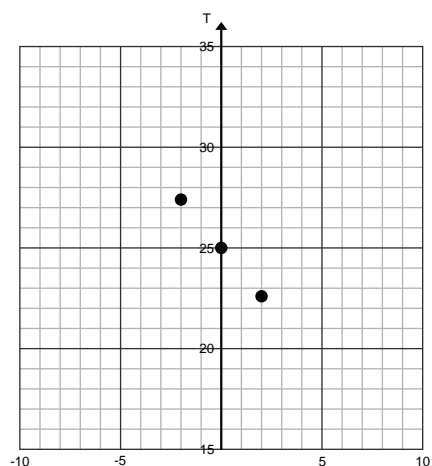
a) The temperature at 4 pm, 8 pm are shown in the chart, calculate the temperature at 10 pm and plot it on the graph.

Time	$h$	Temp
4 pm	-2	27.4
6 pm	0	25
8 pm	+2	22.6
10 pm		

b) Why does it make sense to join the points with a line?

c) Use the graph to estimate the temperature at 3 pm.

d) Would it make sense to use the graph to estimate the temperature at 9 am?



2.

When Bill walks at the speed of 3km/h, the equation for the distance he travels is:  $d = 3t$  where  $d$  is the **distance** in kilometres and  $t$  is the time in **hours** spent walking.

- Create a table of values for the distance he walks in 1 hour, 2 hours, 3 hours and 6 hours. Use it to graph this relation.
- Does it make sense to connect the points with a line?
- Extrapolate using the graph to determine the distance that Bill can walk in 7 hours. Check your answer using the equation.
- Interpolate using the graph to determine the distance that Bill can walk in 5 hours. Check your answer using the equation.
- How many hours does it take to walk 24 km?
- Why don't we have any negative values for  $x$  and  $y$  on this graph? Give an example of a graph where it would be appropriate to have negative values.

