

NOTES 6.2 Properties of Linear Relations

Focus on...

- Representing relations using ordered pairs, table, and graph
- Determining if a relation is linear
- Representing linear relations in a variety of ways
- Explaining why data points should or should not be connected
- Identifying the dependent and independent variables in a relation

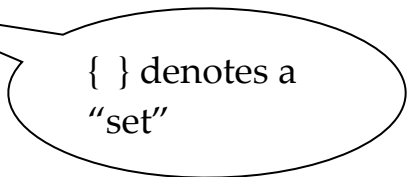
A *set* is a _____ of objects.

An *element* of a set is one _____ in the set.

A *relation* associates the _____ of one set with the elements of another set.

Consider the set of fruits and the set of colours.

- Set of Fruits: {apple, blueberry, cherry, huckleberry}
- Set of Colours: {red, blue, green}



We can associate fruits with their colours using ordered pairs.

1. Ordered pair: _____.
- Is this a relation? Why?

Other ways to represent the relation:

2. Table

3. Graph

1. Which table of values represents a linear relation? Justify your answer.

a) The relation between the number of bacteria in a culture, n , and time, t minutes.

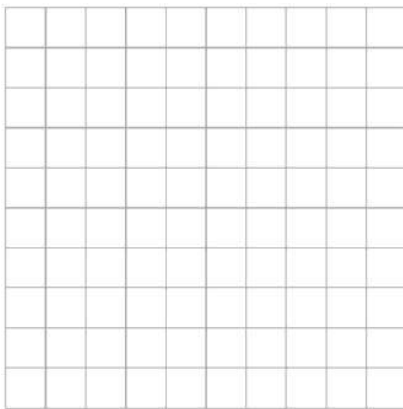
t	n
0	1
20	2
40	4
60	8
80	16
100	32

b) The relation between the amount of goods and services tax charged, T dollars, and the amount of the purchase, A dollars

A	T
60	3
120	6
180	9
240	12
300	15

2. a) Graph each equation.

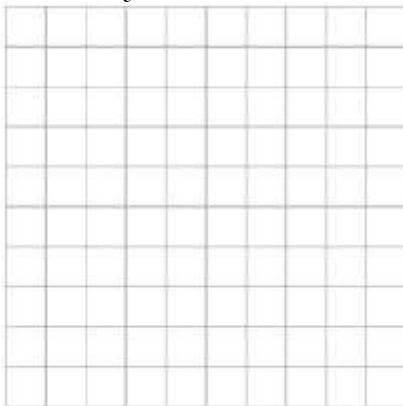
i) $x = -2$



ii) $y = x + 25$



iii) $y = 25$



iv) $y = x^2 + 25$



b) Which equations in part a represent linear relations? How do you know?

3. Which of the following relations below are linear? **Justify your answer.**

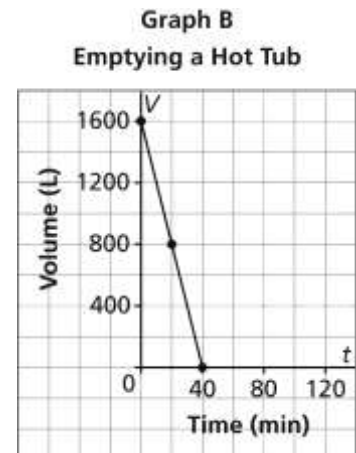
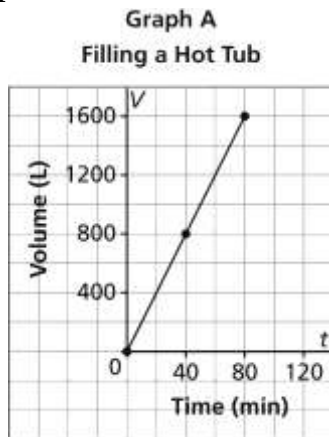
a) A dogsled moves at an average speed of 10 km/h along a frozen river. The distance travelled is related to time.

b) The area of a square is related to the side length of the square.

4. A hot tub contains 1600 L of water.

Graph A represents the hot tub being filled at a constant rate.

Graph B represents the hot tub being emptied at a constant rate.


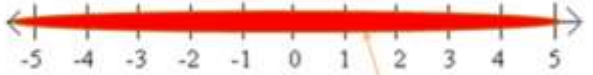


a) Identify the dependent and independent variables.

b) Determine the rate of change of each relation, then describe what it represents.

Vocabulary:

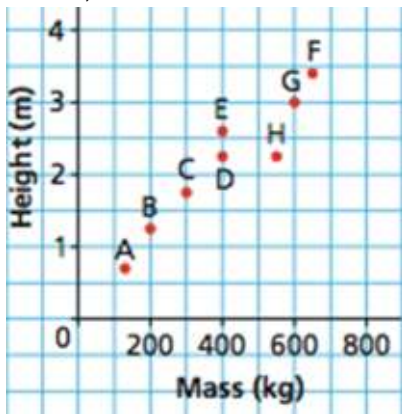
- **Linear relation:** graph is a _____ line.
- **Non-linear relation:** graph is _____ a straight line.

Discrete Data	Continuous Data
<p>Definition:</p> <p>Example:</p> 	<p>Definition:</p> <p>Example:</p> 

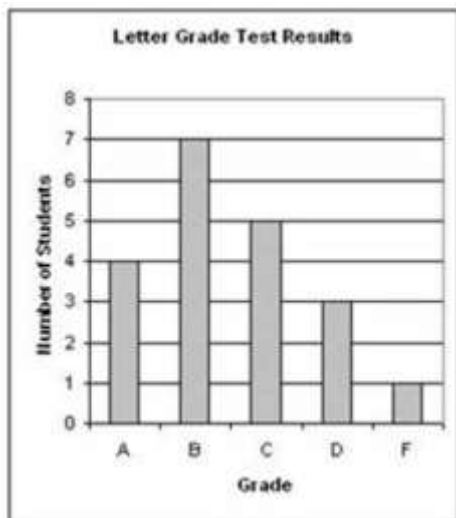
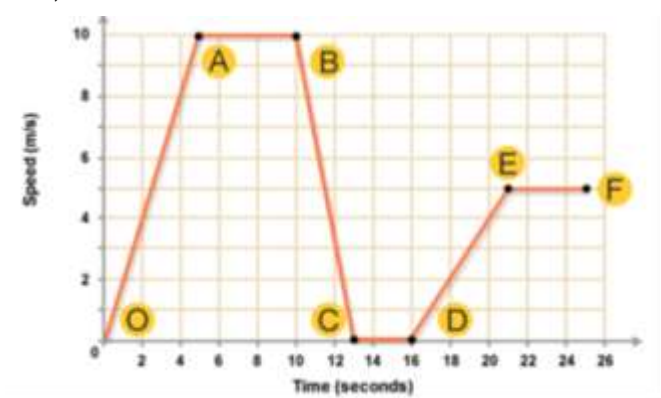
➤ Discrete and Continuous data are examples of _____ data and have numerical values.

5. Are the following graphs discrete or continuous?

a)

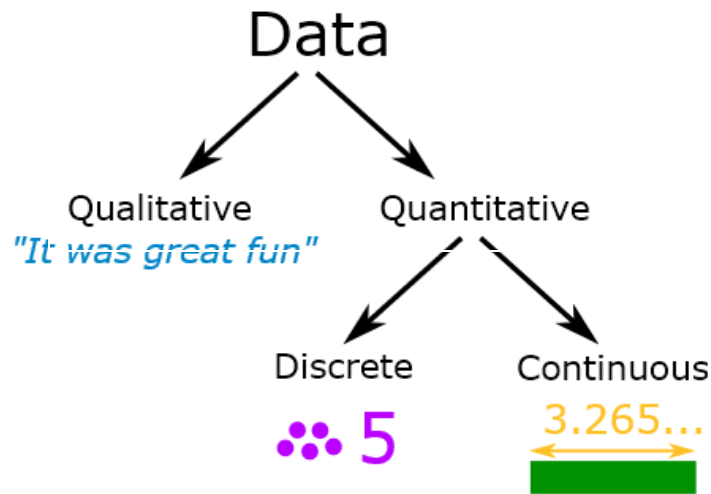


b)



➤ Hint: is "Grade" quantitative data or qualitative data?

➤ Qualitative data: data that _____ but does not have a numerical value

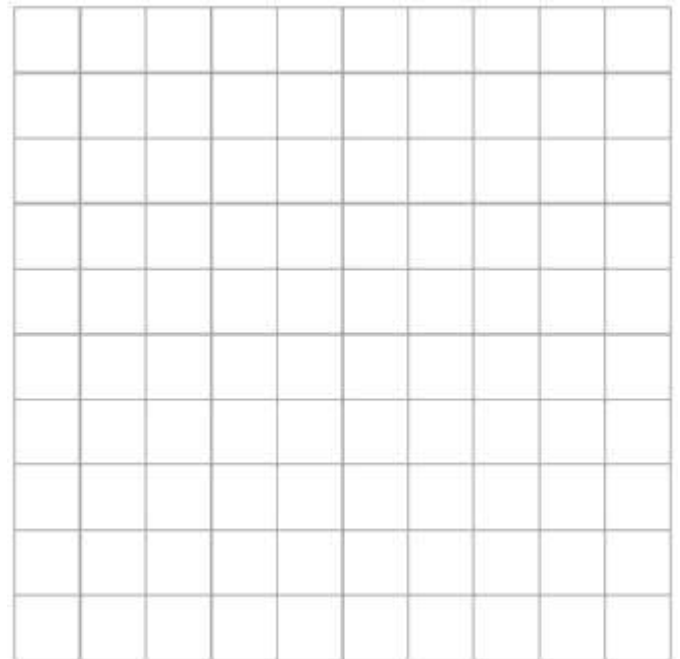


Vocabulary:

- **Independent variable:** values that determine the _____ variable.
- **Dependent variable:** values that change depending on the _____ variable.

6. A frog jumps a distance of 2 m in a single leap. Assume that the frog can maintain a distance of 2 m on every jump and that the total distance travelled from the start is measured after every jump. Consider the relationship between the number of jumps the frog takes and the total distance he travels. Draw a graph of the relation. Then determine if the relation is

- a) Linear or non linear
- b) Discrete or continuous



HW:

P. 287 #1 – 3, 5, 7, 8, 11