

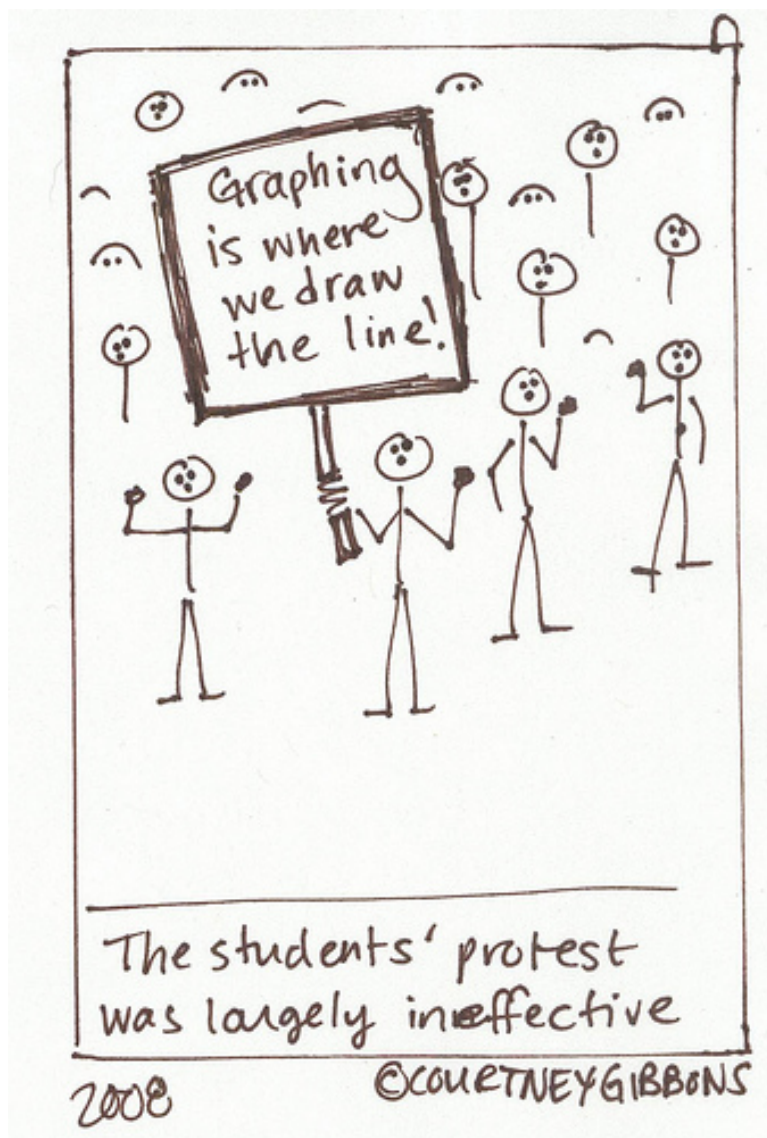
# Unit 2 – Linear Relations

Chapter 2 – Relations

Chapter 5 – Modeling With Graphs

Chapter 6 – Analyze Linear Relations

MPM1D



## Chapter 2 Outline

Section	Subject	Curriculum Expectations	Lesson and Homework Complete (initial)
2.0	Review of Plotting Points	B1.1	
2.1	Hypotheses and Sources of Data	B1.2	
2.2	Sampling Principles		
2.3/2.4	Scatter Plots	B 1.1, B1.2, B1.4, B2.5	
2.5	Linear and Non-Linear Relationships	B1.4, B2.3, C1.1	
2.6	Distance Time Graphs	B2.3, B3.2	

### Unit Performance

**Homework Completion:**    None            Some            Most            All

**Days absent:** \_\_\_\_\_

**Test Review Complete?**    None            Some            All

**Assignment Mark (%):** \_\_\_\_\_

**Test Mark (%):** \_\_\_\_\_

Notes to yourself to help with exam preparation:

## Chapter 5 Outline

Section	Subject	Curriculum Expectations	Lesson and Homework Complete (initial)
5.1	Direct Variation	B2.4, B3.1, B3.3	
5.2	Partial Variation	B2.4, B3.1, B3.3	
5.3a	Slope	C2.1, C2.2	
5.3b	Slope	C2.1, C2.2	
5.4	Slope as a Rate of Change	B3.3, C2.3	
5.5	First Differences	B2.3, C1.1	
5.6	Connecting Everything	B3.3, C3.3	

### Unit Performance

**Homework Completion:**    None            Some            Most            All

**Days absent:**\_\_\_\_\_

**Test Review Complete?**    None            Some            All

**Assignment Mark (%):**\_\_\_\_\_

**Test Mark (%):**\_\_\_\_\_

Notes to yourself to help with exam preparation:

## Chapter 6 Outline

Section	Subject	Curriculum Expectations	Lesson and Homework Complete (initial)
6.1a	Equation of a Line in Slope y-Intercept Form	B3.3, C1.2,C2.2, C3.1	
6.1b	Equation of a Line in Slope y-Intercept Form	B3.3, C1.2,C2.2, C3.1	
6.2	Equation of a Line in Standard Form	C1.3	
6.3	Graphing Using X and Y Intercepts	C3.1	
6.4	Parallel and Perpendicular Lines	C2.4	
6.5	Equation of a Line Given Slope and a Point	C3.2	
6.6	Equation of a Line Given Two Points	C3.2	
6.7	Linear Systems	C3.5	

### Unit Performance

**Homework Completion:**    None            Some            Most            All

**Days absent:** \_\_\_\_\_

**Test Review Complete?**    None            Some            All

**Assignment Mark (%):** \_\_\_\_\_

**Test Mark (%):** \_\_\_\_\_

Notes to yourself to help with exam preparation:

## Section 2.0 – Review of Plotting Points

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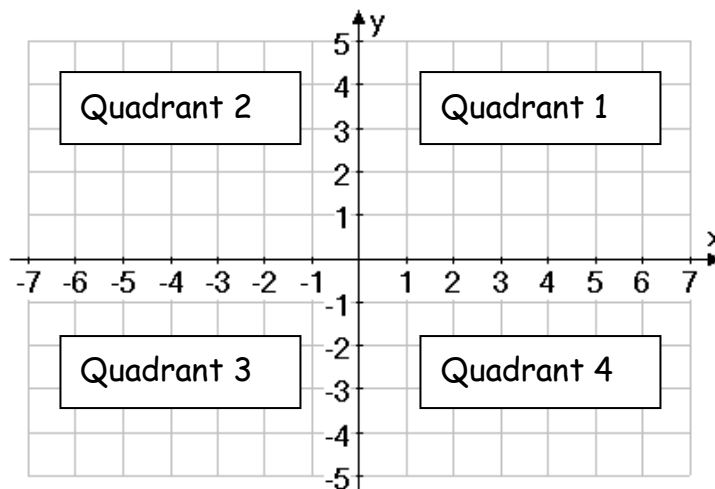
Jensen

### Graphing on the Cartesian Plane



Rene Descartes, a 17<sup>th</sup> century mathematician, developed a system for graphing ordered pairs on a grid. The system, called the Cartesian Coordinate system in his honour, is made up of two perpendicular number lines that meet at a point O which is called the **origin**. The horizontal line is called the x-axis and the vertical line is called the y-axis.

The coordinate system is drawn as shown in the diagram. The positive side of the x-axis is to the right and the negative side to the left. The positive side of the y-axis is up and the negative side is down. The horizontal line is usually called the x-axis and the vertical is called usually called the y-axis. The plane is divided into quadrants. They are labeled in the counterclockwise as shown below.



READ THIS  
CAREFULLY  
BEFORE YOU MOVE  
ON!!!!!!



The ordered pair  $(3, -2)$  represents a point on the Cartesian plane where 3 is the x-coordinate of the point and  $-2$  is the y-coordinate of the point. The x-coordinate determines how far the point is to the left or right of the origin and the y-coordinate determines how far the point is above or below the origin. The point  $(3, -2)$  is 3 units to the right of the origin and 2 units below the origin.

Remember, a point such as  $(3, -2)$  is called an ordered pair because the order of the numbers is important. Ordered pairs are always written in the form (x-coordinate, y-coordinate).

**Example 1:** Graph the following points on the given grid.

A (3, 4)

B (-1, 4)

C (4, -2)

D (-5, -4)

E (2, 5)

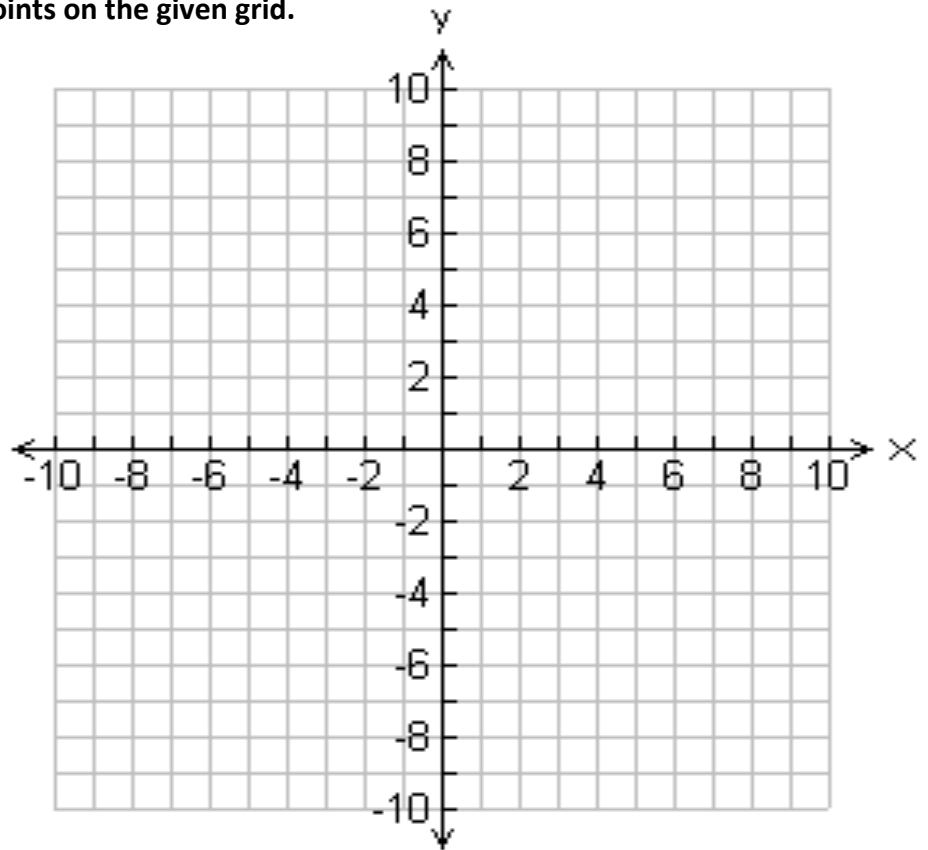
F (-3, -1)

G (-3, 7)

H (6, -2)

I (2, 0)

J (0, -4)



**Example 2:** On your own, graph the following points on the given grid.

A (1, 1)

B (-8, 3)

C (1, -4)

D (-5, -4)

E (2, 9)

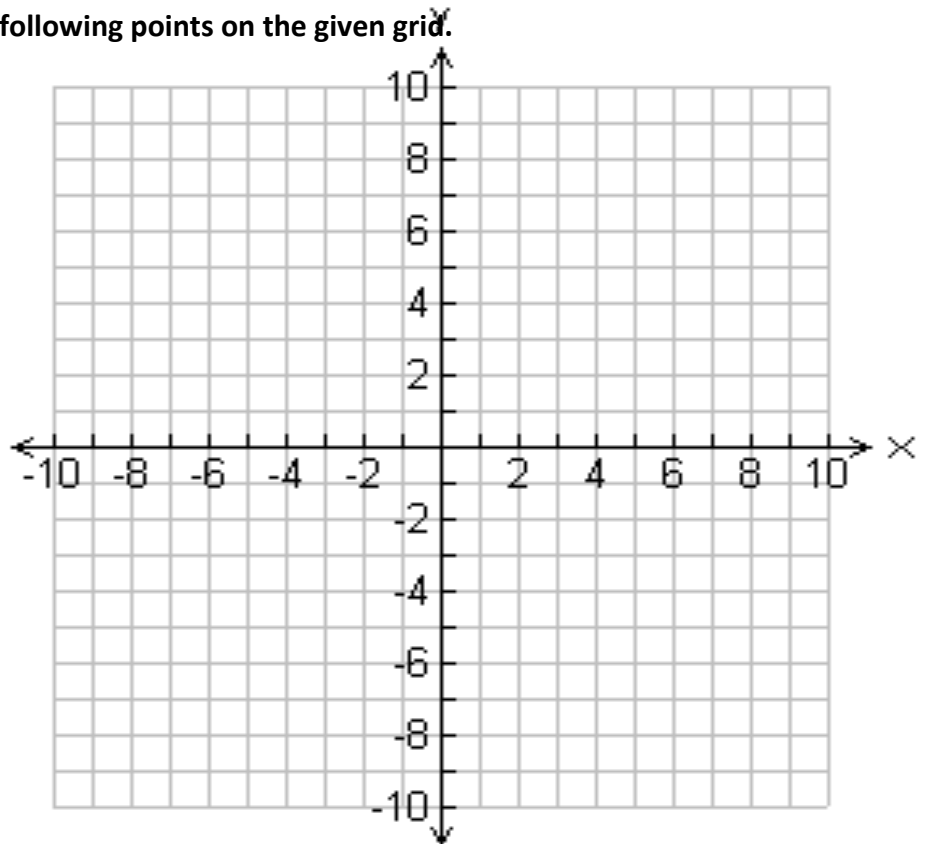
F (-5, -6)

G (-3, 10)

H (7, -2)

I (9, 0)

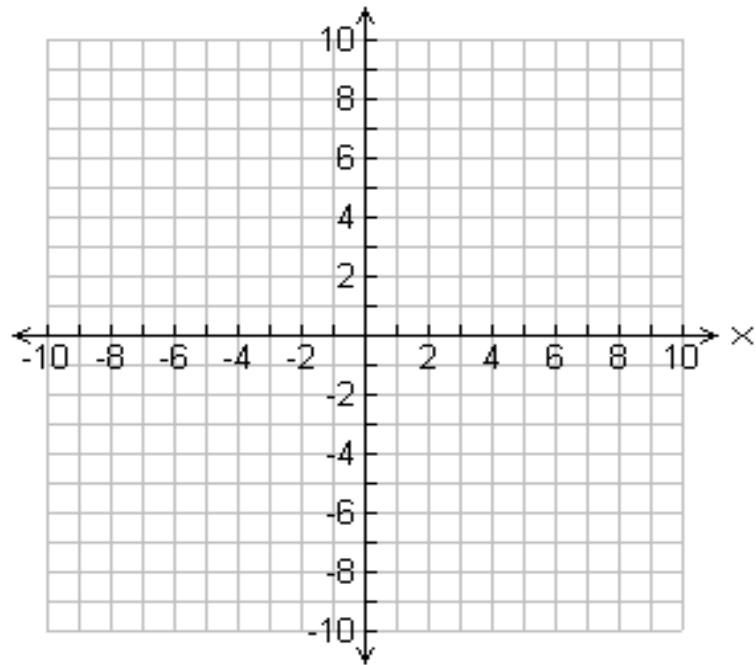
J (0, 3)



**Example 3:** Plot and join the set of points in order. Join the last point to the first point to form a closed figure. Identify the figure and calculate its area in square units.

$D(1, 1)$ ,  $E(1, -2)$ ,  $F(-5, -2)$ ,  $G(-5, 1)$

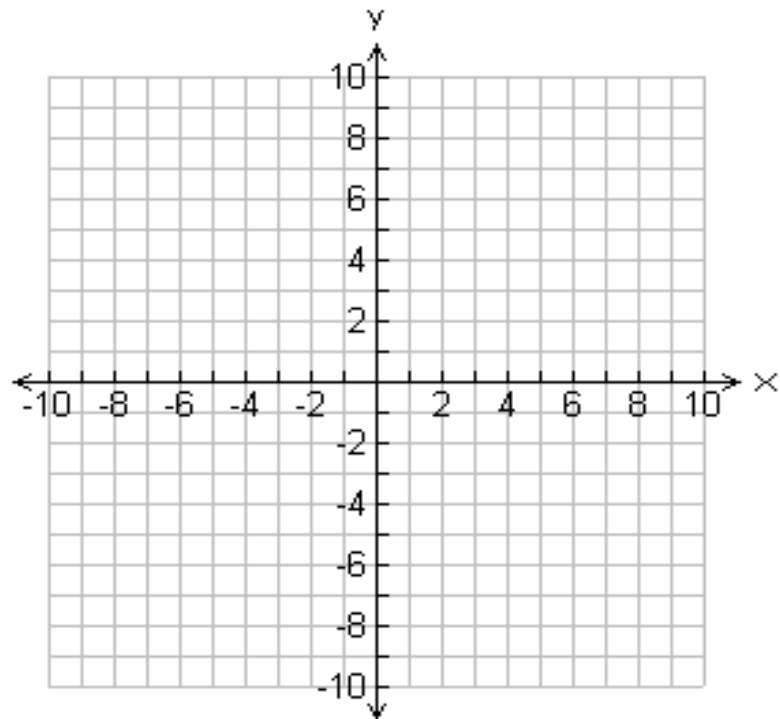
To figure out the length and width you simply need to count how many units are on each side once the figure has been plotted.



**Example 4:** Calculate the area of a triangle with vertices at  $A(-5, -3)$ ,  $B(3, -3)$ , and  $C(3, 8)$

**Step 1:** Plot the points and connect the points to form a triangle

**Step 2:** Find the length of the base and height



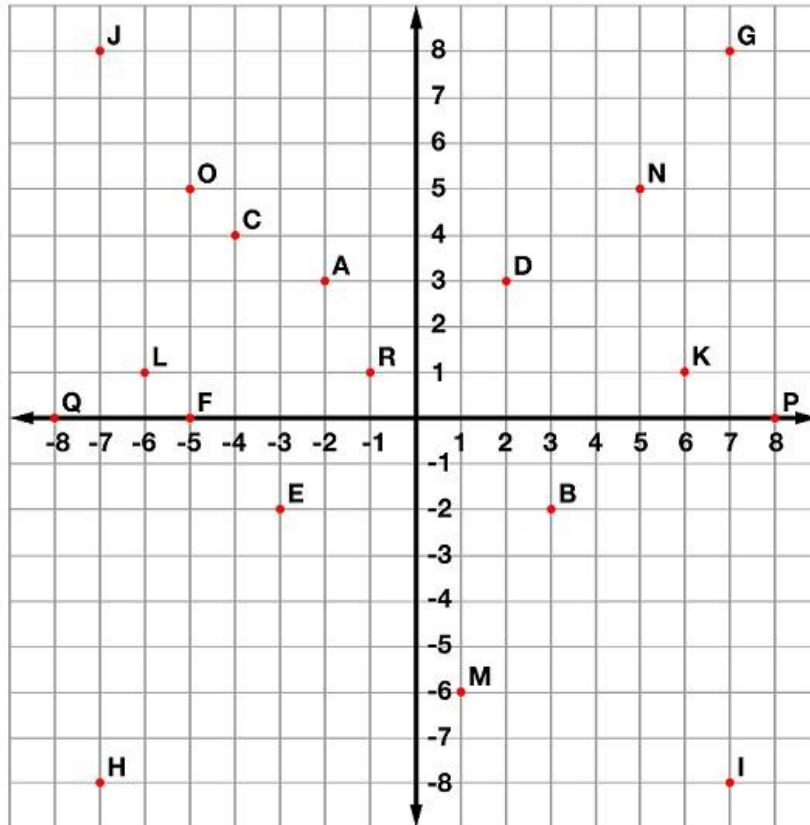
**Step 3:** Calculate the area

Please complete the following worksheets

Name: \_\_\_\_\_

Coordinate Plane & Ordered Pairs

## Ordered Pairs



Tell what point is located at each ordered pair.

- |                     |                    |                    |
|---------------------|--------------------|--------------------|
| 1. $(3, -2)$ _____  | 2. $(2, 3)$ _____  | 3. $(-5, 5)$ _____ |
| 4. $(-7, -8)$ _____ | 5. $(-4, 4)$ _____ | 6. $(-5, 0)$ _____ |

Write the ordered pair for each given point.

- |                    |                    |                    |
|--------------------|--------------------|--------------------|
| 7. <b>E</b> _____  | 8. <b>M</b> _____  | 9. <b>P</b> _____  |
| 10. <b>G</b> _____ | 11. <b>Q</b> _____ | 12. <b>N</b> _____ |

























Plot the following points on the coordinate grid.

- |                         |                        |                       |
|-------------------------|------------------------|-----------------------|
| 13. <b>S</b> $(-6, -3)$ | 14. <b>T</b> $(2, -4)$ | 15. <b>U</b> $(5, 8)$ |
|-------------------------|------------------------|-----------------------|

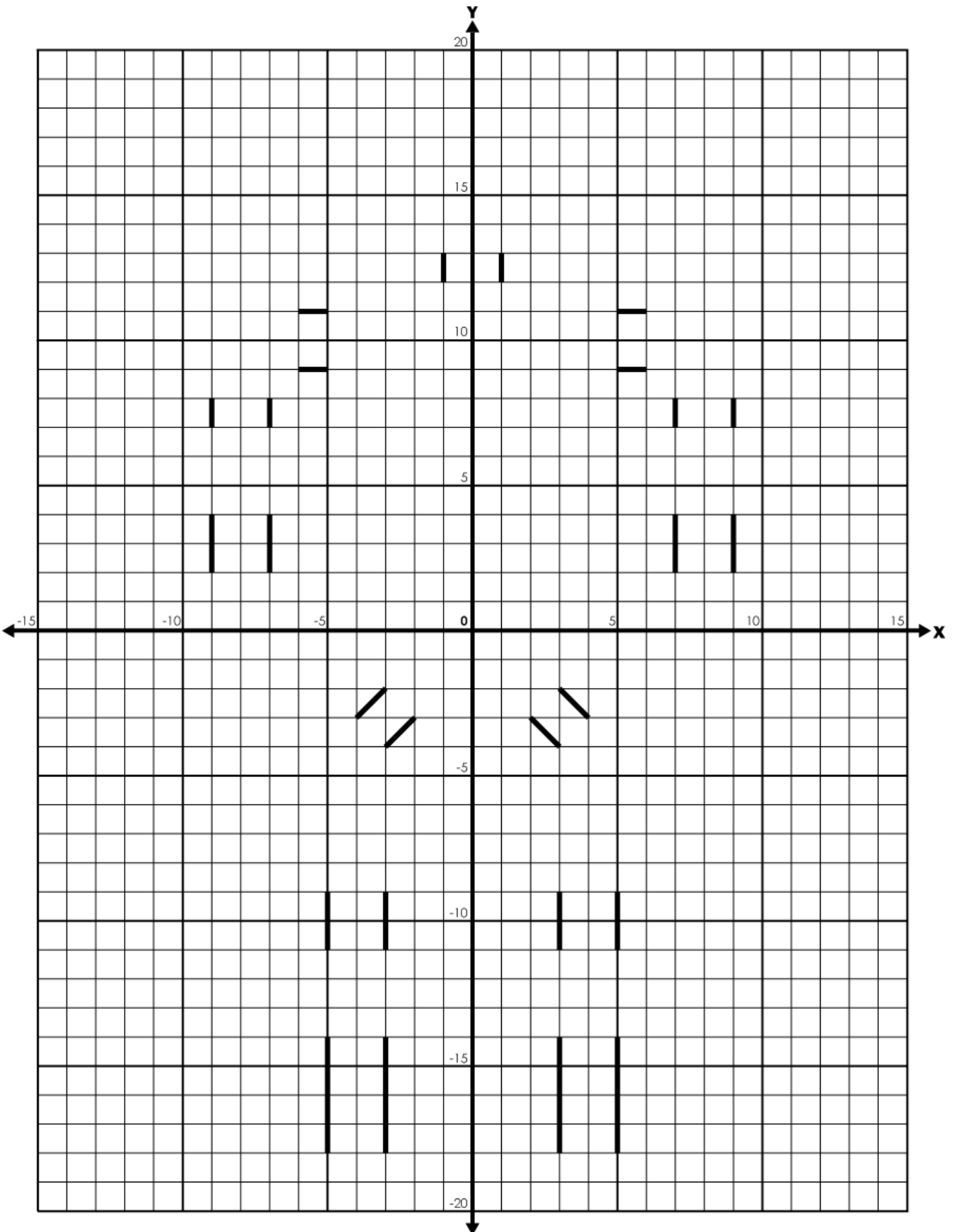


Complete the following by plotting each of the points below on the graph that follows. For each set you will need to plot each point and then connect the points in order to form a line. Stop where you are told to and start a new line for the next set of points.

NOTE: In each section, do NOT connect the last point back to first point.

<u>(X, Y)</u>	<u>(X, Y)</u>	<u>(X, Y)</u>	<u>(X, Y)</u>	<u>(X, Y)</u>
<input type="checkbox"/> (1, -20)	<input type="checkbox"/> (2, -5)	<input type="checkbox"/> (3, 19)	<input type="checkbox"/> (-6, 6)	<input type="checkbox"/> (-6, 1)
<input type="checkbox"/> (1, -19)	<input type="checkbox"/> (5, -2)	<input type="checkbox"/> (-3, 19)	<input type="checkbox"/> (-7, 7)	<input type="checkbox"/> (-6, -1)
<input type="checkbox"/> (3, -18)	<input type="checkbox"/> (6, -2)	<input type="checkbox"/> (-4, 18)	<input type="checkbox"/> (-9, 7)	<input type="checkbox"/> (-7, -1)
<input type="checkbox"/> (5, -18)	<input type="checkbox"/> (6, -8)	<input type="checkbox"/> (-4, 14)	<input type="checkbox"/> (-10, 6)	<input type="checkbox"/> (-7, 0)
<input type="checkbox"/> (7, -19)	<input type="checkbox"/> (5, -9)	<input type="checkbox"/> (-3, 13)	<input type="checkbox"/> (-10, 5)	<input type="checkbox"/> (-8, 1)
<input type="checkbox"/> (7, -20)	<input type="checkbox"/> (3, -9)	<input type="checkbox"/> (3, 13)	<input type="checkbox"/> (-9, 4)	<input type="checkbox"/> (-9, 0)
<input type="checkbox"/> (1, -20)	<input type="checkbox"/> (2, -8)	<input type="checkbox"/> (4, 14)	<input type="checkbox"/> (-7, 4)	<input type="checkbox"/> (-9, -2)
	<input type="checkbox"/> (2, -5)	<input type="checkbox"/> (4, 18)	<input type="checkbox"/> (-6, 5)	<input type="checkbox"/> (-10, -2)
		<input type="checkbox"/> (3, 19)	<input type="checkbox"/> (-6, 6)	<input type="checkbox"/> (-10, 1)
				<input type="checkbox"/> (-9, 2)
<input type="checkbox"/> (-1, -20)	<input type="checkbox"/> (-2, -5)			<input type="checkbox"/> (-7, 2)
<input type="checkbox"/> (-1, -19)	<input type="checkbox"/> (-5, -2)	<input type="checkbox"/> (-6, 11)	<input type="checkbox"/> (6, 6)	<input type="checkbox"/> (-6, 1)
<input type="checkbox"/> (-3, -18)	<input type="checkbox"/> (-6, -2)	<input type="checkbox"/> (-7, 12)	<input type="checkbox"/> (7, 7)	
<input type="checkbox"/> (-5, -18)	<input type="checkbox"/> (-6, -8)	<input type="checkbox"/> (-9, 12)	<input type="checkbox"/> (9, 7)	
<input type="checkbox"/> (-7, -19)	<input type="checkbox"/> (-5, -9)	<input type="checkbox"/> (-10, 11)	<input type="checkbox"/> (10, 6)	<input type="checkbox"/> (1, 16)
<input type="checkbox"/> (-7, -20)	<input type="checkbox"/> (-3, -9)	<input type="checkbox"/> (-10, 9)	<input type="checkbox"/> (10, 5)	<input type="checkbox"/> (3, 16)
<input type="checkbox"/> (-1, -20)	<input type="checkbox"/> (-2, -8)	<input type="checkbox"/> (-9, 8)	<input type="checkbox"/> (9, 4)	<input type="checkbox"/> (3, 18)
	<input type="checkbox"/> (-2, -5)	<input type="checkbox"/> (-7, 8)	<input type="checkbox"/> (7, 4)	<input type="checkbox"/> (1, 18)
		<input type="checkbox"/> (-6, 9)	<input type="checkbox"/> (6, 5)	<input type="checkbox"/> (1, 16)
<input type="checkbox"/> (3, -14)		<input type="checkbox"/> (-6, 11)	<input type="checkbox"/> (6, 6)	
<input type="checkbox"/> (5, -14)				
<input type="checkbox"/> (6, -13)	<input type="checkbox"/> (1, -4)			<input type="checkbox"/> (-1, 16)
<input type="checkbox"/> (6, -12)	<input type="checkbox"/> (4, -1)	<input type="checkbox"/> (6, 11)	<input type="checkbox"/> (6, 1)	<input type="checkbox"/> (-3, 16)
<input type="checkbox"/> (5, -11)	<input type="checkbox"/> (4, 1)	<input type="checkbox"/> (7, 12)	<input type="checkbox"/> (6, -1)	<input type="checkbox"/> (-3, 18)
<input type="checkbox"/> (3, -11)	<input type="checkbox"/> (-4, 1)	<input type="checkbox"/> (9, 12)	<input type="checkbox"/> (7, -1)	<input type="checkbox"/> (-1, 18)
<input type="checkbox"/> (2, -12)	<input type="checkbox"/> (-4, -1)	<input type="checkbox"/> (10, 11)	<input type="checkbox"/> (7, 0)	<input type="checkbox"/> (-1, 16)
<input type="checkbox"/> (2, -13)	<input type="checkbox"/> (-1, -4)	<input type="checkbox"/> (10, 9)	<input type="checkbox"/> (8, 1)	
<input type="checkbox"/> (3, -14)	<input type="checkbox"/> (1, -4)	<input type="checkbox"/> (9, 8)	<input type="checkbox"/> (9, 0)	
		<input type="checkbox"/> (7, 8)	<input type="checkbox"/> (9, -2)	
		<input type="checkbox"/> (6, 9)	<input type="checkbox"/> (10, -2)	<input type="checkbox"/> (-3, 11)
<input type="checkbox"/> (-3, -14)	<input type="checkbox"/> (-3, 4)	<input type="checkbox"/> (6, 11)	<input type="checkbox"/> (10, 1)	<input type="checkbox"/> (-3, 8)
<input type="checkbox"/> (-5, -14)	<input type="checkbox"/> (-5, 8)		<input type="checkbox"/> (9, 2)	<input type="checkbox"/> (3, 8)
<input type="checkbox"/> (-6, -13)	<input type="checkbox"/> (-5, 12)		<input type="checkbox"/> (7, 2)	<input type="checkbox"/> (3, 11)
<input type="checkbox"/> (-6, -12)	<input type="checkbox"/> (5, 12)	<input type="checkbox"/> (-2, 19)	<input type="checkbox"/> (6, 1)	<input type="checkbox"/> (-3, 11)
<input type="checkbox"/> (-5, -11)	<input type="checkbox"/> (5, 8)	<input type="checkbox"/> (-2, 20)		
<input type="checkbox"/> (-3, -11)	<input type="checkbox"/> (3, 4)	<input type="checkbox"/> (2, 20)		
<input type="checkbox"/> (-2, -12)	<input type="checkbox"/> (-3, 4)	<input type="checkbox"/> (2, 19)		
<input type="checkbox"/> (-2, -13)			<input type="checkbox"/> (2, 15)	<input type="checkbox"/> (-2, 4)
<input type="checkbox"/> (-3, -14)		<input type="checkbox"/> (2, 4)	<input type="checkbox"/> (2, 14)	<input type="checkbox"/> (-2, 1)
			<input type="checkbox"/> (-2, 14)	
		<input type="checkbox"/> (2, 1)	<input type="checkbox"/> (-2, 15)	
			<input type="checkbox"/> (2, 15)	
				

Now color your picture.



## Section 2.1 – Hypotheses and Sources of Data

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### Part 1: Hypothesis

**Hypothesis:** The Pittsburgh Penguins are the most popular sports franchise.

Discuss the validity of this hypothesis:

How could this hypothesis be verified?

What is a hypothesis?....

A \_\_\_\_\_ is a theory or statement that is either true or false.

Practice making hypotheses about the relationship between each pair of variables :

1. The number of texts sent per day and the age of a person?
2. How much a person likes the Penguins and their IQ?
3. The size of an animal and its lifespan?

### Part 2: Hypotheses and their Opposites

Write a hypothesis about a relationship between the variables in each pair. Then, give the opposite hypothesis.

- 4) A driver's age and the risk of having an accident

5) Homework completion and marks.

### **Part 3: Sources of Data**

\_\_\_\_\_ : Original data that a researcher gathers specifically for a particular experiment or survey

\_\_\_\_\_ : Data that someone else has already gathered for some other purpose

6) Which of the following is a primary source of data:

- a) an article in a magazine
- b) a database
- c) conducting an experiment to test the effectiveness of a new medication
- d) an entry from an online encyclopedia

7) Which of the following is a secondary source of data:

- a) conducting a survey amongst your classmates
- b) conducting an experiment to study the effects of pollution
- c) data collected 100 years ago by the Canadian government
- d) counting the makes of cars in a mall parking lot

Explain whether each set of data is primary or secondary. What are the advantages and disadvantages of each person's choice of data source.

8) Daniel phoned 100 families in his town to ask them how many pets they owned:

9) Cathy used data from Statistics Canada to determine the proportion of households in Canada that have at least one car.

## Section 2.2 – Sampling Principles

MPM1D

Jensen

### Part 1: Do It Now

King's Christian Collegiate wants to get a mascot for sporting events. They want the mascot to appeal to all of the students in the school. The school administration wants to ask student's what they want but they are unsure how to decide fairly. Should they:

- a) Ask all of the grade 9 students
- b) Let the first 100 students who arrive at school fill out a survey
- c) Ask 6 students from every period 1 class
- d) Ask all students whose last name starts with A,D, or Y
- e) Let Mr. Jensen decide, he will think of something awesome

Which one did you pick and why?

### Part 2: Definitions

Population:

Sample:

Census:

Why is the whole population not always surveyed when a hypothesis about the population is to be verified?

1) For which of the following is a sample suitable?

- a) Find the most common make of car in the school parking lot.
- b) Find your family's favourite food.
- c) Find the most popular video game among grade 9 students in your class.
- d) Find the favourite video game among grade 9 students in Canada.

**MISTER BOFFO** By Joe Martin



### **Part 3: Types of Sampling**

Random Sample:

Example:

Non-Random Sampling:

Example:

### **Part 4: Types of Random Sampling**

Simple Random Sampling:

Example:

Systematic Random Sampling:

Example:

Stratified Random Sampling:

Example:

2) Classify the sampling technique used in each survey as simple random, systematic random, stratified random, or non-random sampling.

- a) The principal selects people that work in the cafeteria to interview about the quality of cafeteria food.
- b) A computer is programmed to randomly select 100 names from a club's membership list.
- c) Students are selected at random, with the number of students in each age group selected proportional to the size of the age group.
- d) To select 100 people who can buy concert tickets, the ticket agent randomly selects one wristband number and then every 10th number after that.

3) Hobson's Company surveyed its 2000 customers by generating 200 random numbers between 1 and 2000, and then selecting names from the customer list corresponding to these numbers. This is an example of:

- a) systematic random sampling
- b) non-random sampling
- c) stratified random sampling
- d) simple random sampling

4) Which of the following is not an example of random sampling?

- a) Use a random number generator to pick 10% of the players in each division of a hockey league.
- b) Use a randomly generated number between 1 and 10 to pick a name on a list, and then select every 8th person on the list.
- c) Ask every 10th person entering a mall for an opinion on government spending on health care.
- d) Write names on slips of paper, and then pick the names out of a hat, making sure the pieces of paper are well mixed.

5) Which of the following is a systematic random sample?

- a) A name is randomly selected from a list of a store's customers and every 10th person is selected before and after it.
- b) A Member of Parliament randomly selects phone numbers from a city directory to survey citizen's opinions on government taxation.
- c) The principal selects the same fraction of students from each class for a survey.
- d) The Human Resources department of Acme Manufacturing Company sends out surveys to 50 employees randomly selected from the entire list of employees.

### **Part 5: Bias**

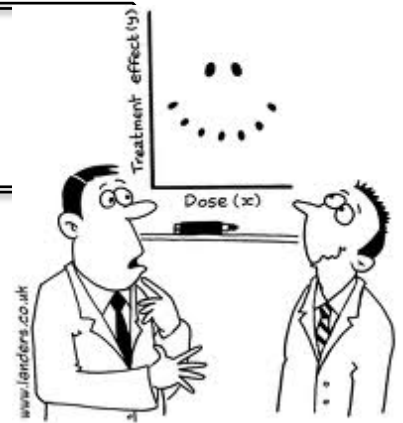
Bias:

6) A sample could be biased if it is:

- a) too small
- b) only based on one gender and age group
- c) not randomly drawn
- d) all of the above

# Section 2.3/2.4 – Scatter Plots

MPM1D  
Jensen



\_\_\_\_\_ : a variable that affects the value of another variable

\_\_\_\_\_ : a variable that is affected by some other variable

## Example:

**Independent** - time spent practicing free throws

**Dependent** - free throw percentage in games

Your free throw percentage **depends on** the amount of time you spend practicing free throws.

1)

# of Hours John Studies	John's Test Score
0	75
.5	80
1	85
1.5	90
2	95
2.5	100

Independent Variable:

Dependent Variable:

How are they related?

2)

Number of Guests	Meal Preparation Time (min)
3	25
4	33
5	41
6	49
7	57
8	65

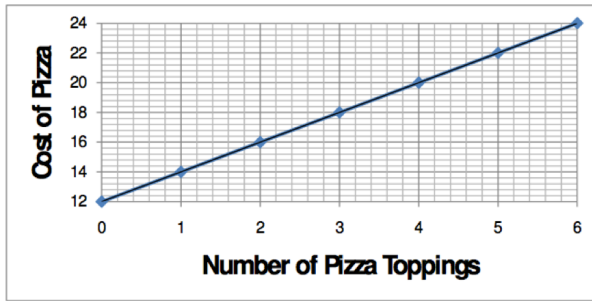
Independent Variable:

Dependent Variable:

How are they related?



3)



Independent Variable:

Dependent Variable:

How are they related?

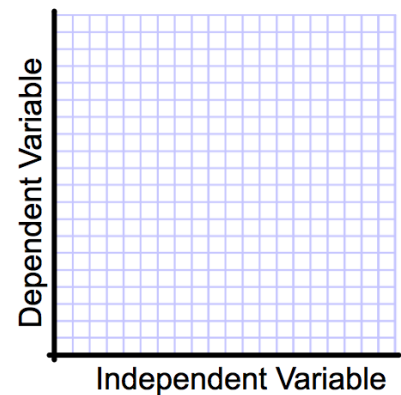
4) Now fill in the following the chart using your understanding of each type of variable:

Independent Variable	Dependent Variable
Number of gallons in your gas tank	
	Your IQ
Number of calories you eat each day	
	Your level of happiness
Number of hours you study for a test	

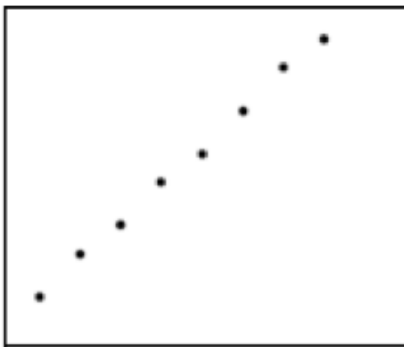

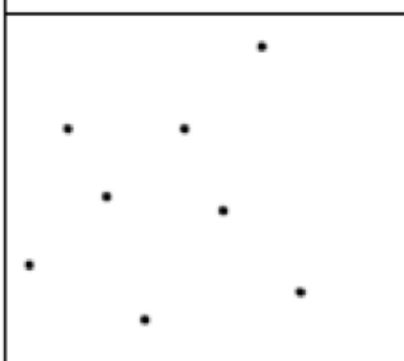
## Part 2: Scatter Plots

A **Scatter plot** is a graph that shows the \_\_\_\_\_ between two variables.

The Independent variable goes on the horizontal ( $x$ ) axis, and the dependent variable goes on the vertical ( $y$ ) axis.



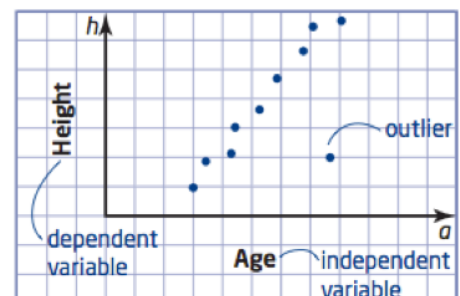
## Types of Correlations:

	<p>A scatter plot shows a _____ correlation when the pattern rises up to the right.</p> <p><i>This means that the two quantities increase together.</i></p>
	<p>A scatter plot shows a _____ correlation when the pattern falls down to the right.</p> <p><i>This means that as one quantity increases the other decreases.</i></p>
	<p>A scatter plot shows _____ correlation when no pattern appears.</p> <p><i>Hint:</i> <u>If the points are roughly enclosed by a circle, then there is no correlation.</u></p>

Correlations can also be \_\_\_\_\_ or \_\_\_\_\_ depending on how close or spread out the points on the scatter plot are.

Define an outlier:

When should you include an outlier in your data set?

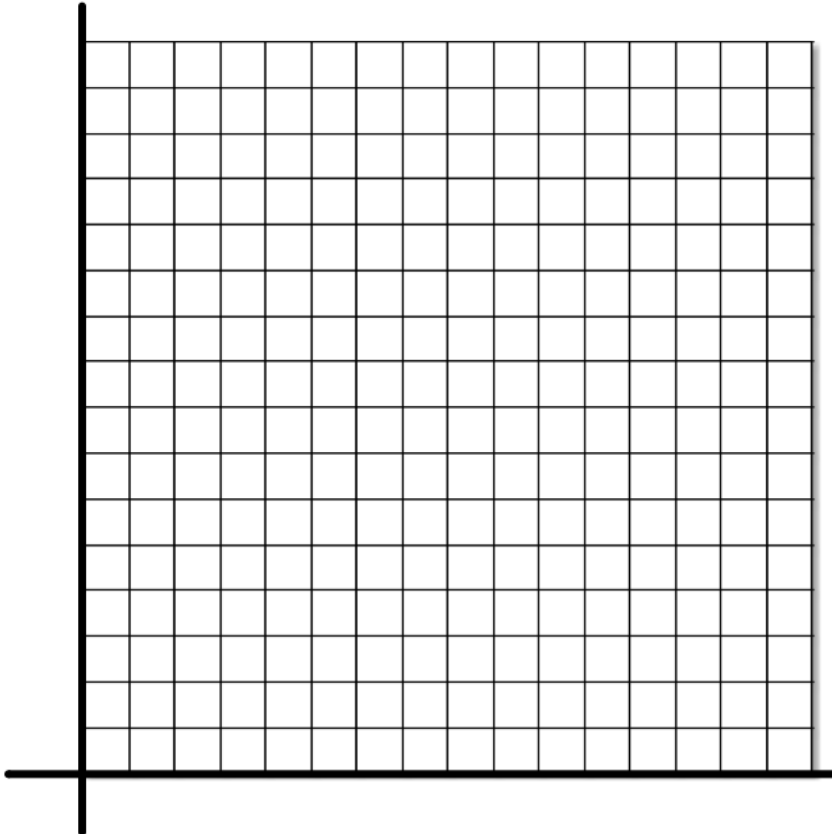
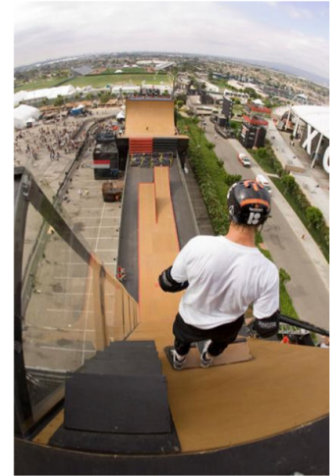


When shouldn't you?

## Make a Scatter Plot

5) A skateboarder starts from various points along a steep ramp and coasts to the bottom. This table lists the initial height and his speed at the bottom of the ramp.

Initial Height (m)	2.0	2.7	3.4	3.8	4.0	4.5	4.7	5.0
Speed (m/s)	4.4	5.2	5.8	6.1	4.5	6.5	6.6	6.9



Independent Variable:

Dependent Variable:

Describe the relationship:

Are there any outliers? If so what are possible reasons for the outlier?

### Part 3: Line of Best Fit

A line of best fit can help you see the relationship between variables and also to make interpolations and extrapolations.

#### **Properties of a line of best fit:**

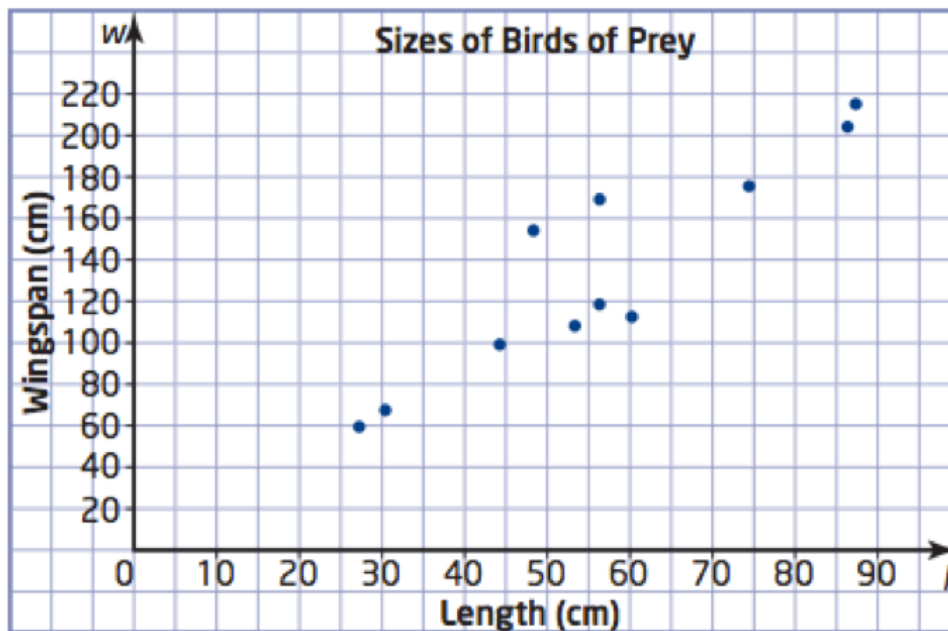
1.

2.

Interpolation:

Extrapolation:

Practice drawing a line of best fit:



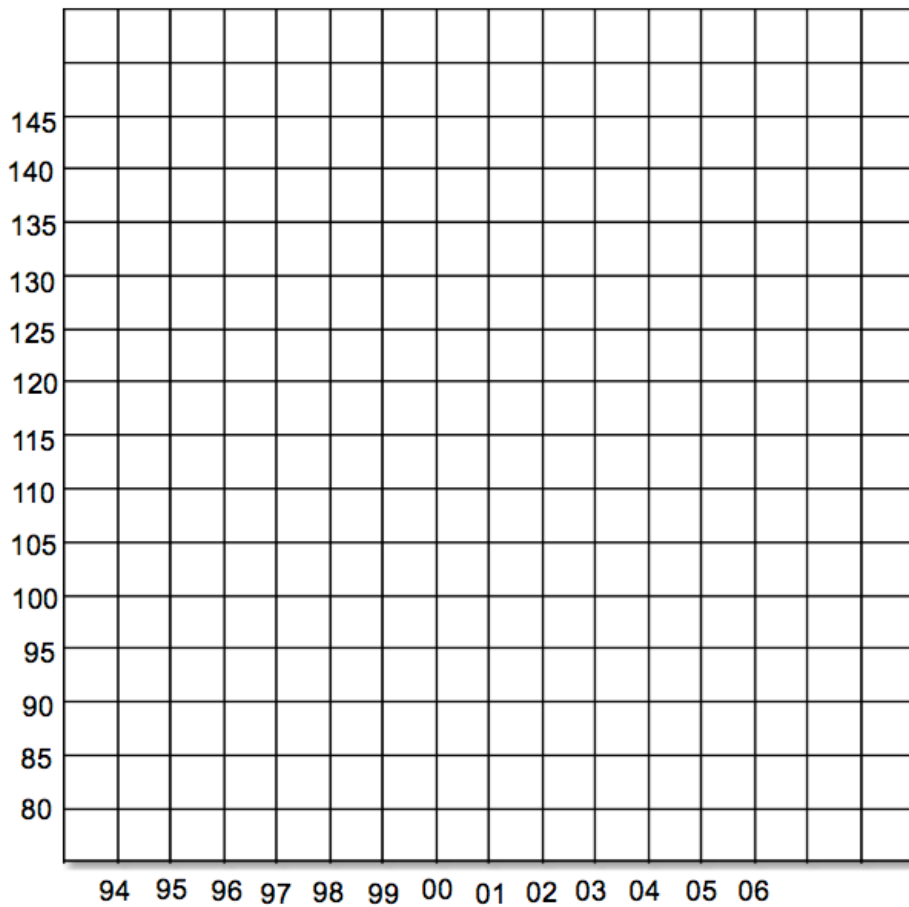
6) This table shows the number of paid movie admissions in Canada for 12-month periods.

Fiscal Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Attendance (millions)	83.8	87.3	91.3	99.1	111.6	119.3	119.3	no data	125.4	119.6

Independent Variable:

Dependent Variable:

Graph the data and draw a line of best fit:



Describe the correlation:

There is no data for 2001, estimate the movie attendance for this year using your line of best fit?

Did you use interpolation or extrapolation to estimate this data?

Estimate the movie attendance for 2005 by extending your line of best fit:

Did you use interpolation or extrapolation to estimate this data?

## Section 2.5 – Linear and Non-Linear Relationships

MPM1D

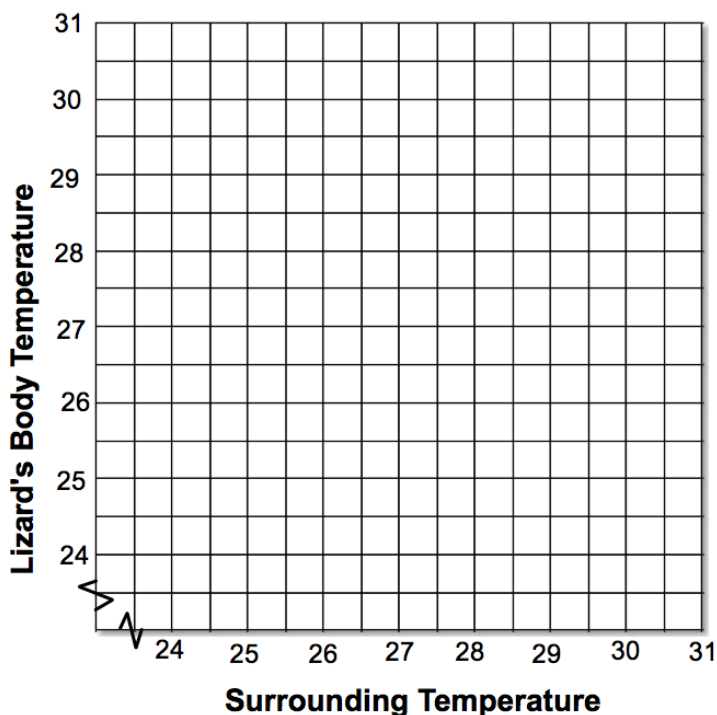
Jensen

### Part 1: Do It Now

The gymnophthalmid lizard lives in the Amazon rainforest. Recent research found that this lizard keeps its body temperature close to the temperature of its surroundings. The table lists data from this research.

Surrounding Temperature (°C)	25.0	24.8	27.9	30.3	28.2	24.8	25.6	29.9	25.5	28.4	28.5	28.0	27.9
Lizard's Body Temperature (°C)	26.2	28.2	29.7	30.3	29.8	28.3	27.6	30.8	29.5	30.0	28.8	28.7	29.0

a) Graph the data



b) Draw a line of best fit

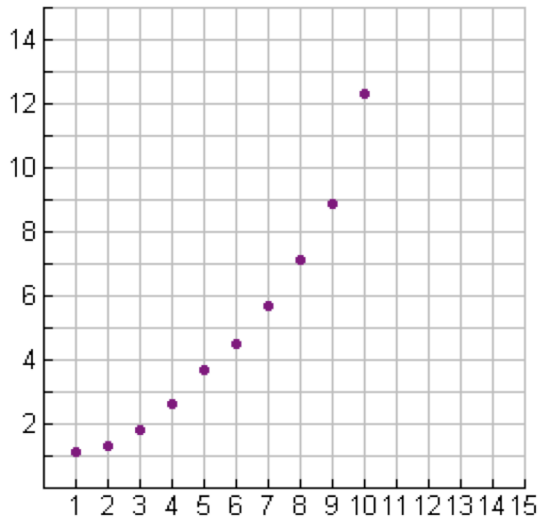
c) Estimate the lizard's body temperature if the surrounding temperature is 26°C. Is this interpolation or extrapolation?

d) Estimate the lizard's temperature if the surrounding temperature is 31 degrees Celcius. Is this interpolation or extrapolation?

**Example 1:**

A scatter plot of the following ten points is given below.

x	1	2	3	4	5	6	7	8	9	10
y	1.1	1.3	1.8	2.6	3.7	4.5	5.7	7.1	8.9	12.3



Gandolf predicts that when  $x$  is 11,  $y$  will be 11.  
Merlyn predicts that when  $x$  is 11,  $y$  will be 15.

Who is correct? Why?

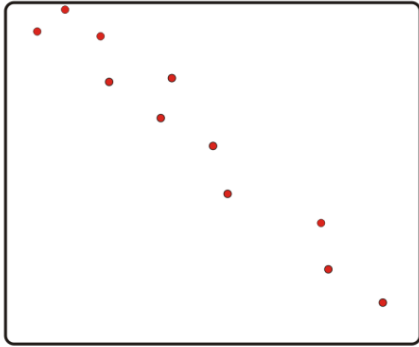
Many non-linear relations can be modeled with a \_\_\_\_\_. You can draw curves of best fit using the same method as for a line of best fit. A curve of best fit should:

1. Pass through or close to as many points as possible,
2. Any points that are not on the curve should be distributed evenly above and below it.

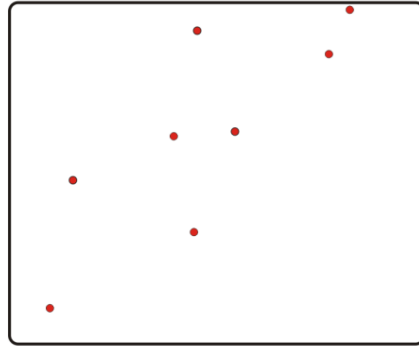


**Example 2:** Describing Scatter Plots and Lines/Curves of Best Fit

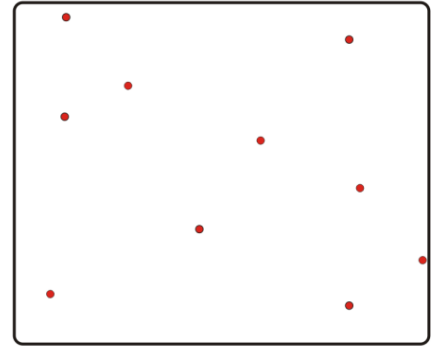
Draw a line or curve of best fit for each of the scatter plots below, if possible. Write two or three key words to describe each relation on the line below the scatter plot. (*positive relationship, negative relationship, no relationship, strong, weak, linear, non-linear*)



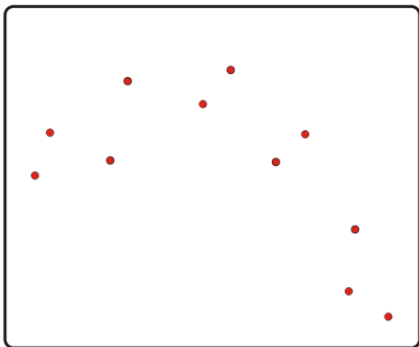
a) \_\_\_\_\_



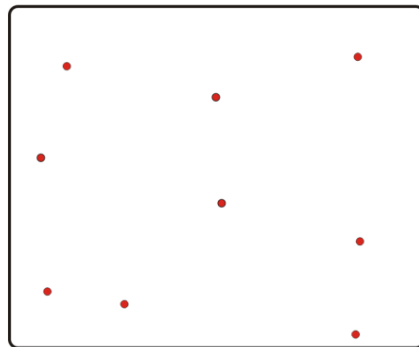
b) \_\_\_\_\_



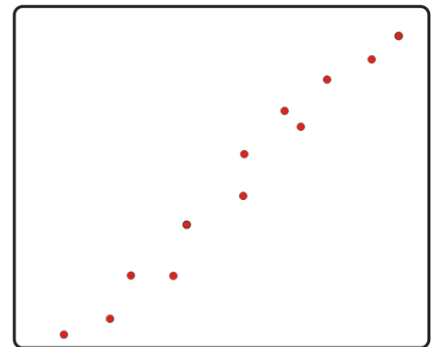
c) \_\_\_\_\_



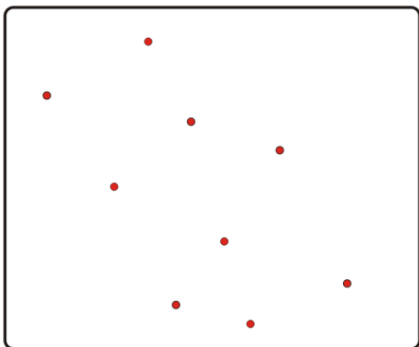
d) \_\_\_\_\_



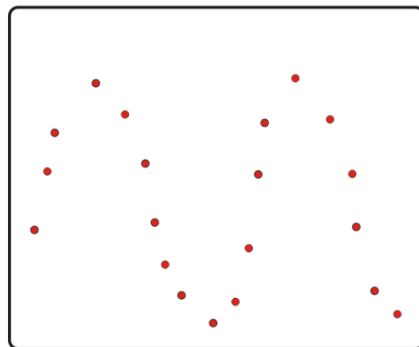
e) \_\_\_\_\_



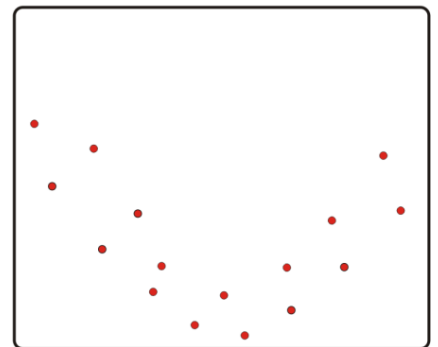
f) \_\_\_\_\_



g) \_\_\_\_\_



h) \_\_\_\_\_

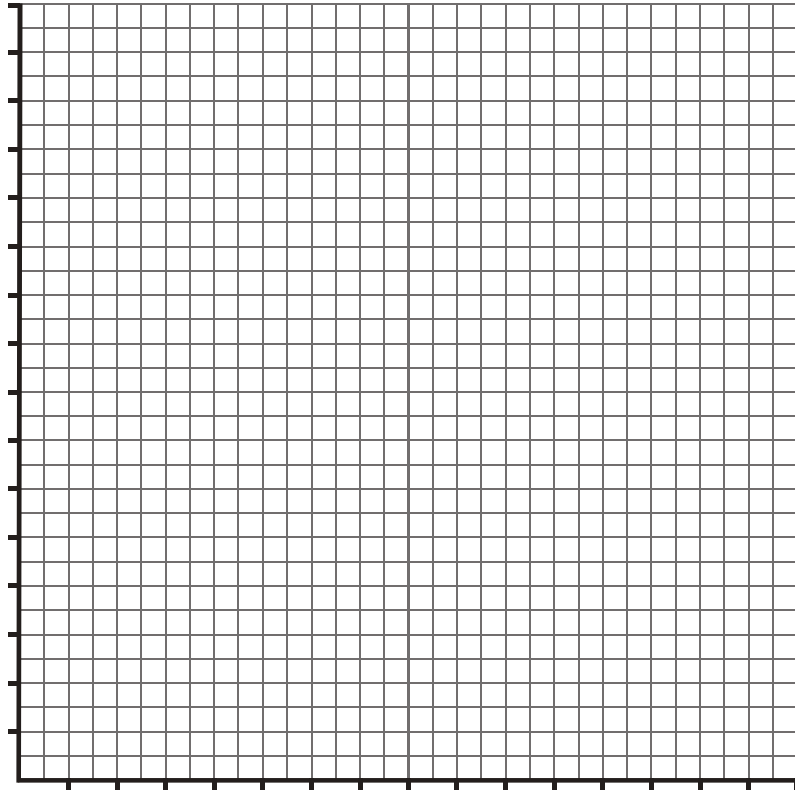


i) \_\_\_\_\_

**Example 3:** Test the hypothesis: The older you are, the more money you earn.

Plot the data on the scatter plot below, choosing appropriate scales and labels.

Age	Earnings (\$)
25	22000
30	26500
35	29500
37	29000
38	30000
40	32000
41	35000
45	36000
55	41000
60	41000
62	42500
65	43000
70	37000
75	37500



**a)** Draw a curve of best fit. Describe the trend in the data.

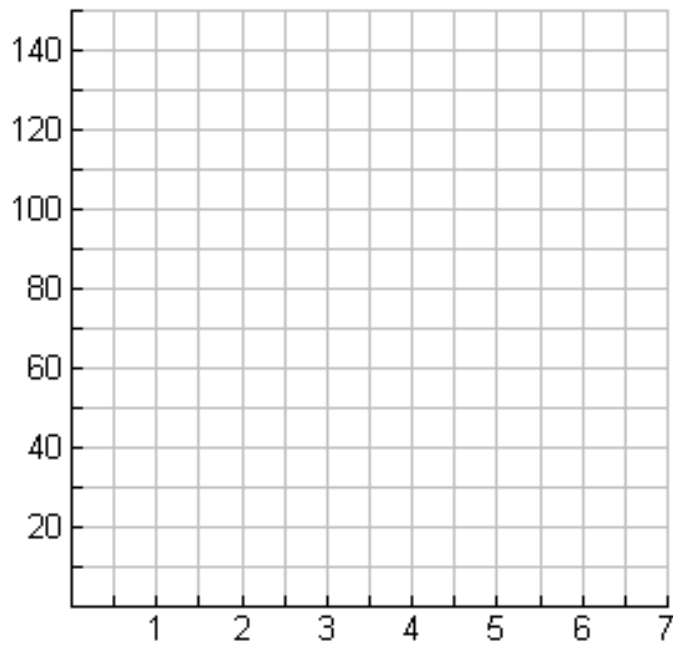
**b)** Does the data support the hypothesis? Give reasons to support your answer.  
(Refer to the scatter plot.)

**c)** Explain why the data for ages over 65 do not correspond with the hypothesis.

**Example 4:** A skydiver jumps from an airplane. The distance fallen and time taken are recorded in the table.

<b>Time (s)</b>	<b>Distance (m)</b>
0	0
1	5
2	19
3	42
4	74
5	115

**a)** Draw a scatter plot of the relation and draw a line or curve of best fit.



**b)** Classify the relation as linear or non-linear. Explain your choice.

**c)** How far will the skydiver have fallen in 3.5 s?

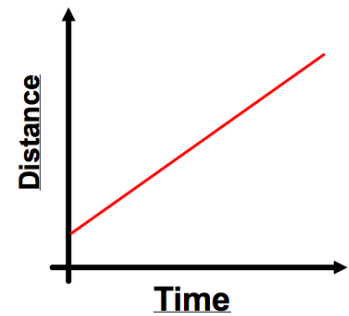
## Section 2.6 – Distance Time Graphs

MPM1D

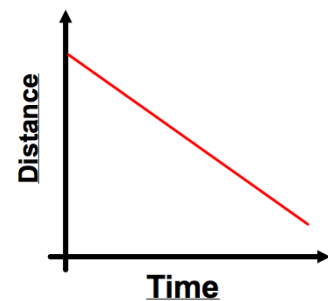
Jensen

### Part 1: Intro to Distance-Time Graphs

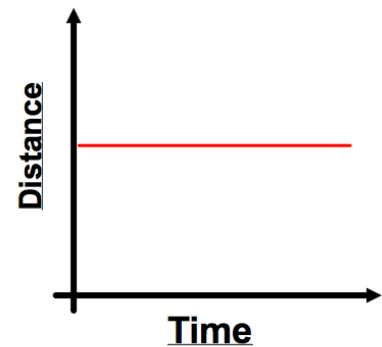
A *distance-time graph* shows an object's distance from a fixed point over a period of time. A rising line shows that distance from a point \_\_\_\_\_ as time increases.



A falling line shows that distance from a point \_\_\_\_\_ as time increases.



A horizontal line shows that distance from a point remains \_\_\_\_\_.



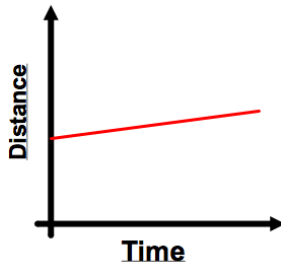
## Part 2: Rate of Movement

The **speed** of a person affects the steepness of the graph.

The steeper the line is, the \_\_\_\_\_ the rate of movement.

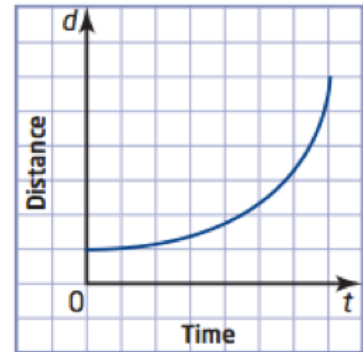
Remember:

Which graph represents slow movement? Which one represent fast movement?

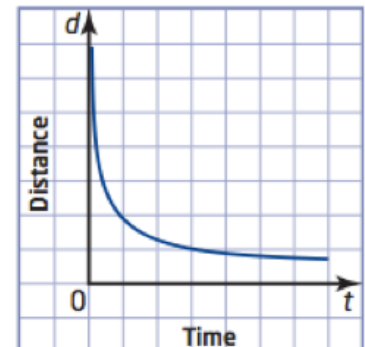


### Changes of Rate of Movement

A curve may represent an increase in rate of movement  
(\_\_\_\_\_)

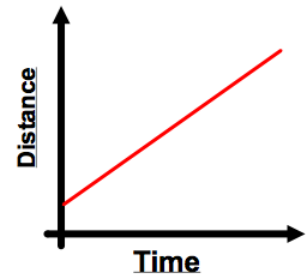


A curve may represent a decrease in rate of movement  
(\_\_\_\_\_)



A straight line represents an object moving at a

\_\_\_\_\_ or \_\_\_\_\_.



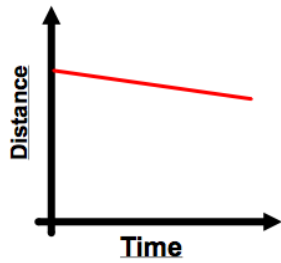
**Part 3: Practice Describing Distance Time Graphs**

1) A person walks in front of a motion sensor. Describe the motion that would produce each of the following graphs:

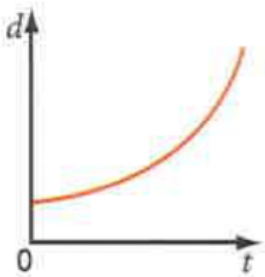
a)



b)



c)



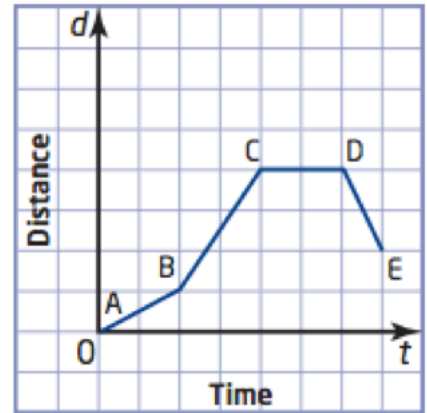
2) Describe the following graph that represents a person's distance from home over a period of time:

AB:

BC:

CD:

DE:

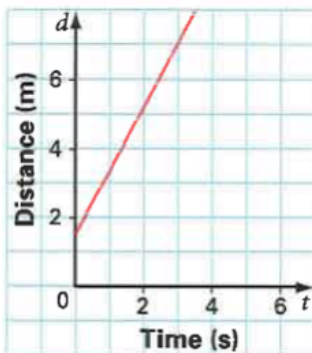


3) Describe the motion represented by each of the following graphs:

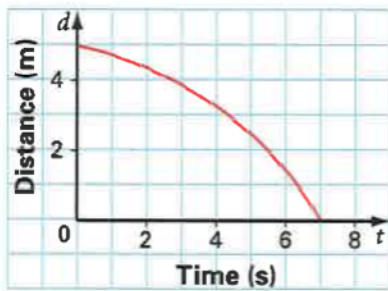
a)



b)

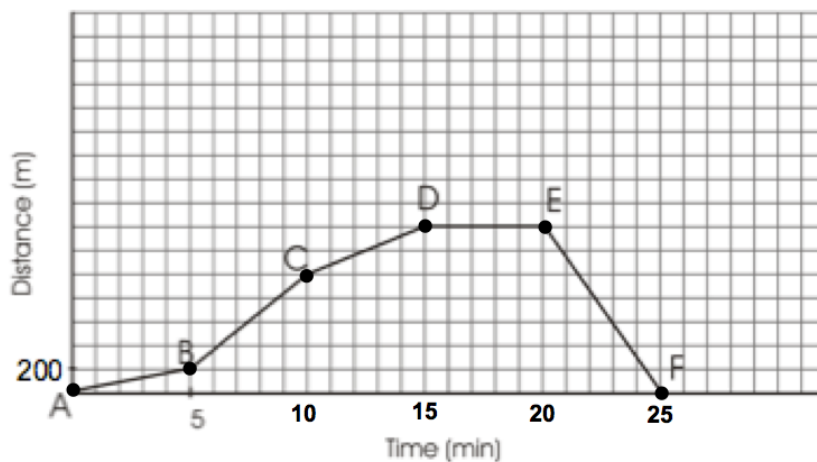


c)





4) Chris walks each day as part of his daily exercise. The graph shows his distance from home as he walks his route.



Using the graph, give an explanation of what is occurring over Chris' walk. Include information about time, distance, direction and speed during each segment

**AB:**

**BC:**

**CD:**

**DE:**

**EF:**



#### Part 4: Creating a Distance Time Graph

5) Create a graph that shows Mr. Jensen's **distance from his own team's net** while he is playing hockey based on the following scenario:

Mr. Jensen starts with the puck in his own end and skates away from his net towards the other teams end at a steady pace. At center ice he gets the puck stolen from him. Mr. Jensen is furious and stops for a couple seconds to slam his stick on the ice in frustration. He then decides to chase down the guy who stole the puck from him. He accelerates back towards his own net and steals the puck. He then slams on the brakes and skates at a fast steady pace away from his net towards the other team's net. He is so fast that he gets a breakaway and scores (bar down of course).

