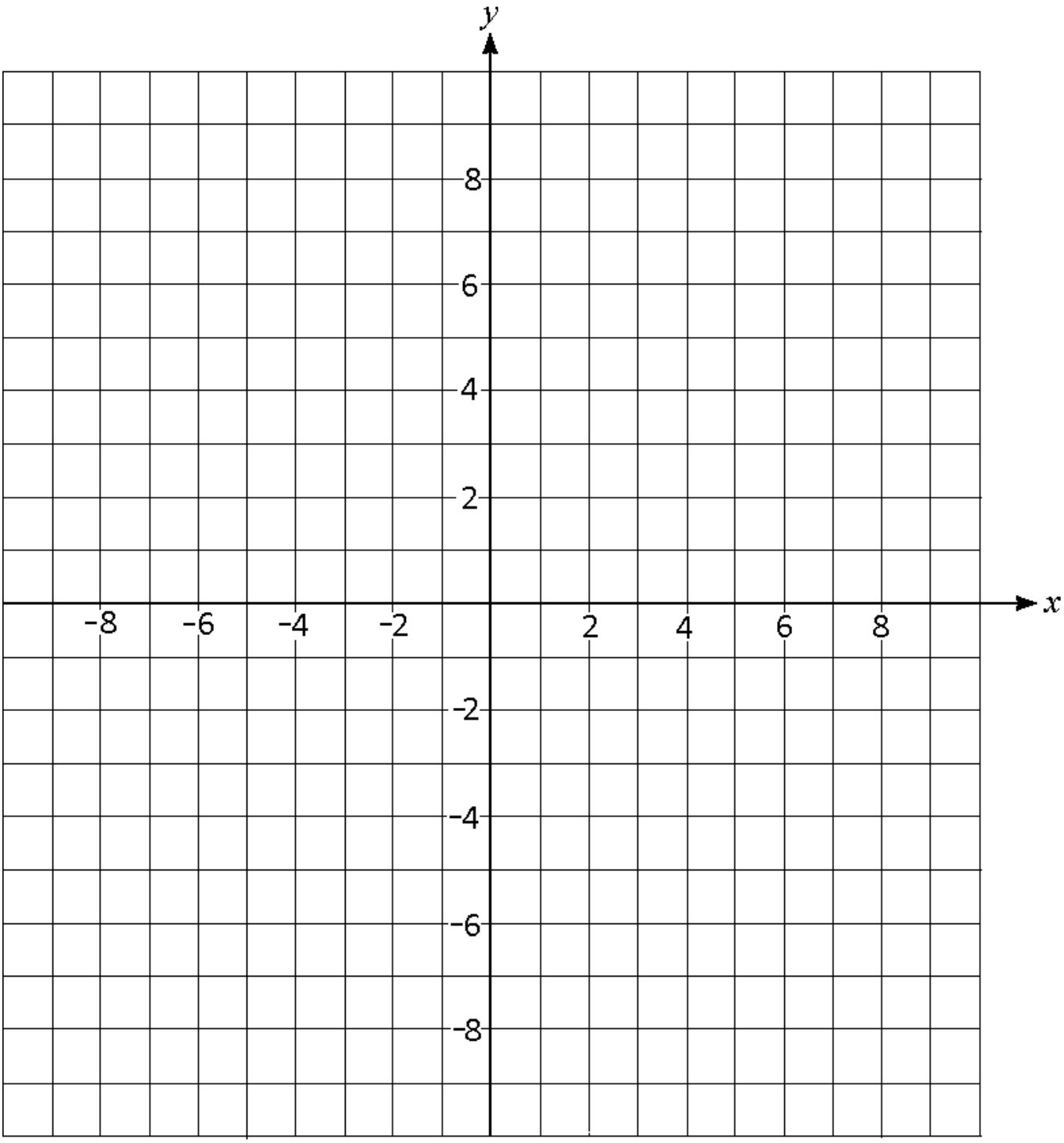
Unit 8

Graphing
&
Data Analysis

8-1 Coordinates and Graphing

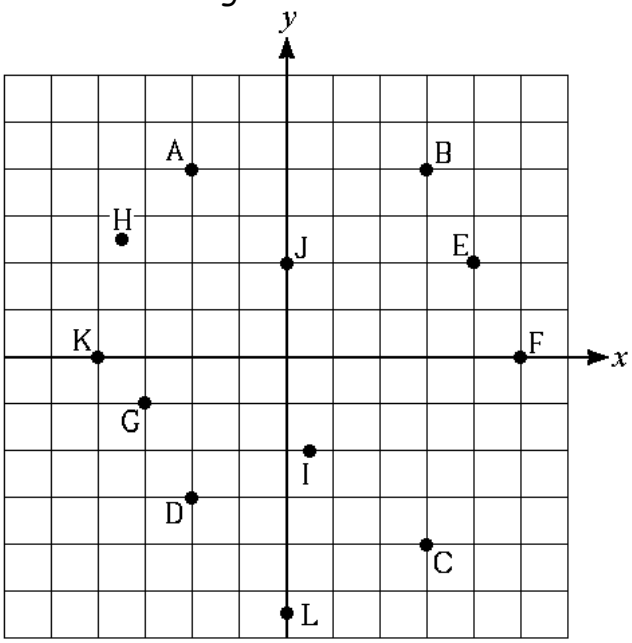


8-1 Coordinates and Graphing

NOTE: In all graphs in section 8-1, both horizontal and vertical grid lines will be spaced one unit apart.

1. Give the coordinates of each point:

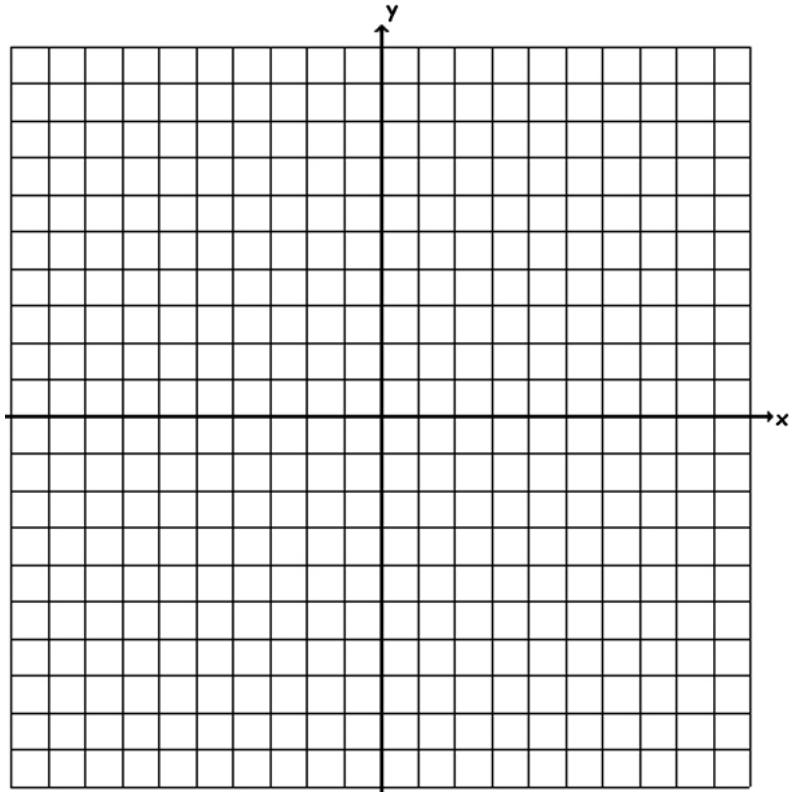
A_____ B_____
C_____ D_____
E_____ F_____
G_____ H_____
I_____ J_____
K_____ L_____



2. a) How far from the x-axis is the point (3, -4)?
   b) How far from the y-axis is the point (-7, 4)?
   c) How far from the point (-2,3) is the point (5,3)?
   d) Give at least 5 different points, which are 5 units away from the origin.

3. Plot and label the following points on the grid (you may need to estimate for some).

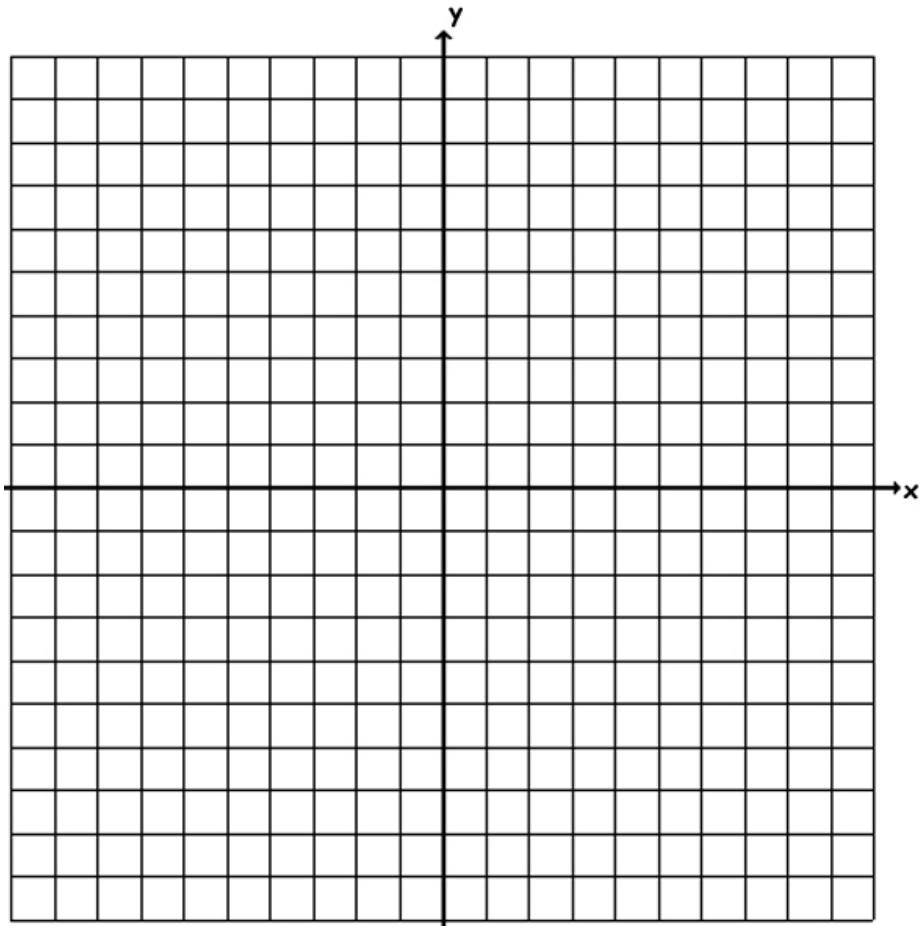
A (3, 7) B (4, 2)
C (-3, 8) D (-5, -2)
E (0, 5) F (2, 0)
G (-6, 0) H (0, -4)
I (2.5, -5) J (-4.5, 3)
K (-0.5, -6.5)
L (5.25, 6.75)



4. a) Complete the table of values for the relation $y = 2x - 1$.

y					1	–3		9	–6
x	0	2	–4	0.5					

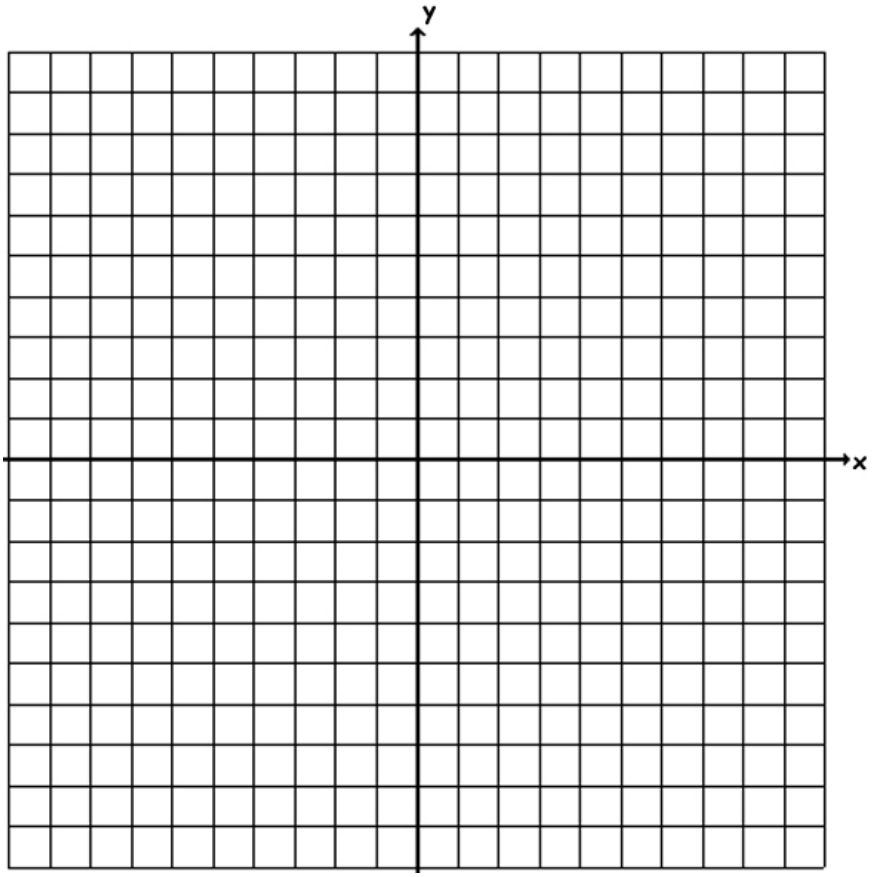
b) Using the points, plot the relation $y = 2x - 1$ on the grid below.



5. a) Complete the table of values for the relation $x + y = 8$. (Choose your own values. Note that $x + y = 8$ is the same as $y = -x + 8$.)

y								
x								

b) Using the table, plot the relation $x + y = 8$ on the grid below.

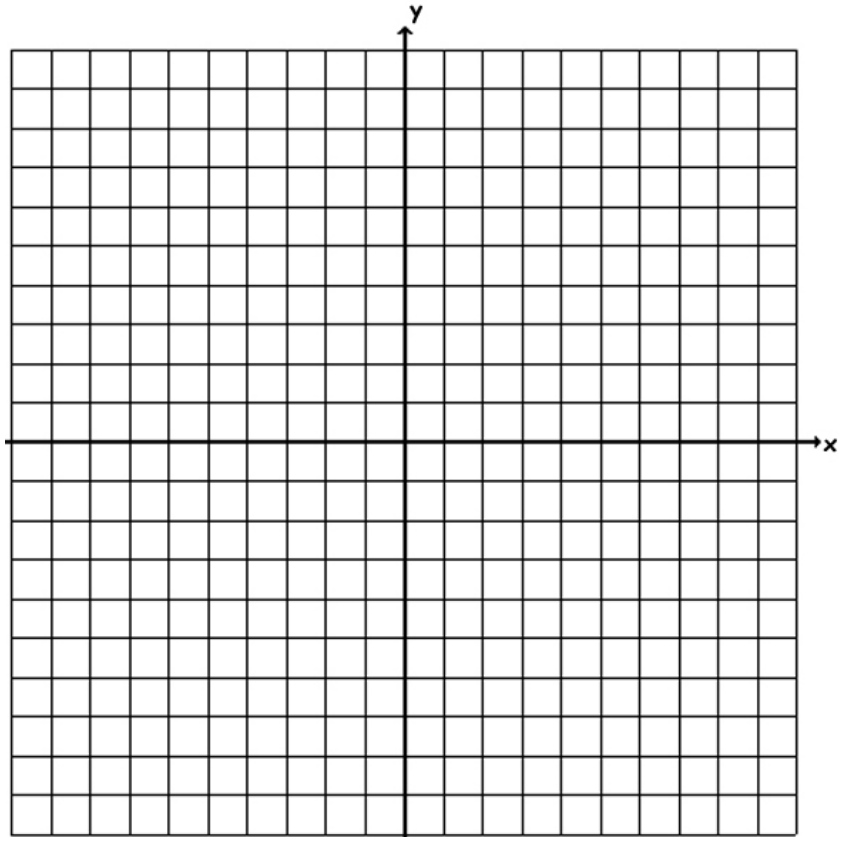


6. a) Complete the table of values for the relation $y = \frac{1}{2}x + 3$.

If possible, try to choose x-values, which will give whole numbers for y, but also make sure all your points will fit on the grid.

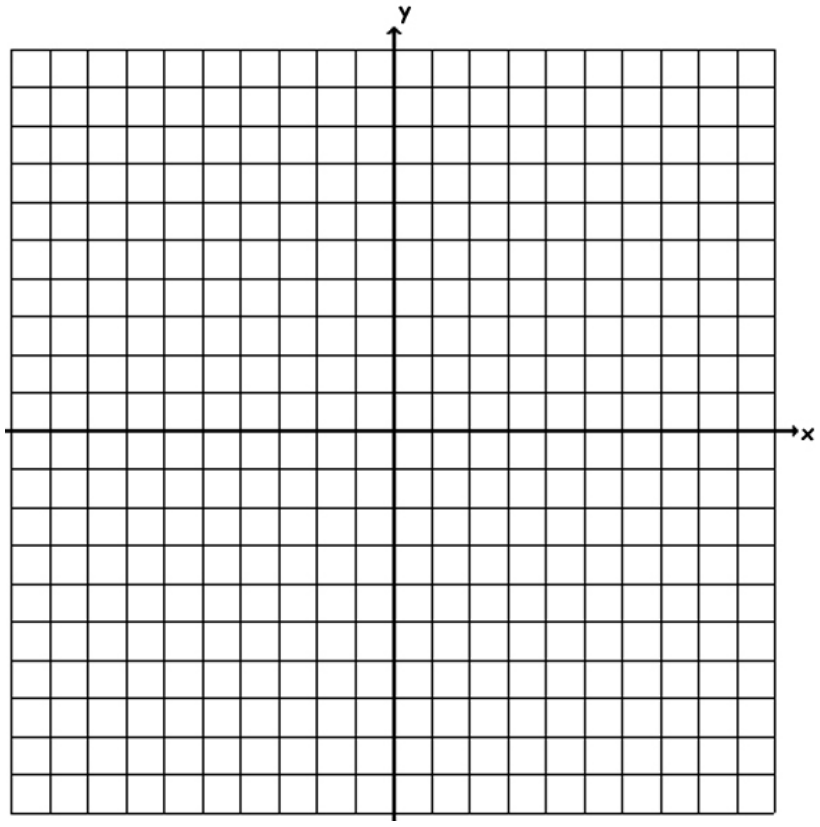
y									
x									

c) Using the points, plot the relation $y = \frac{1}{2}x + 3$ on the grid below.

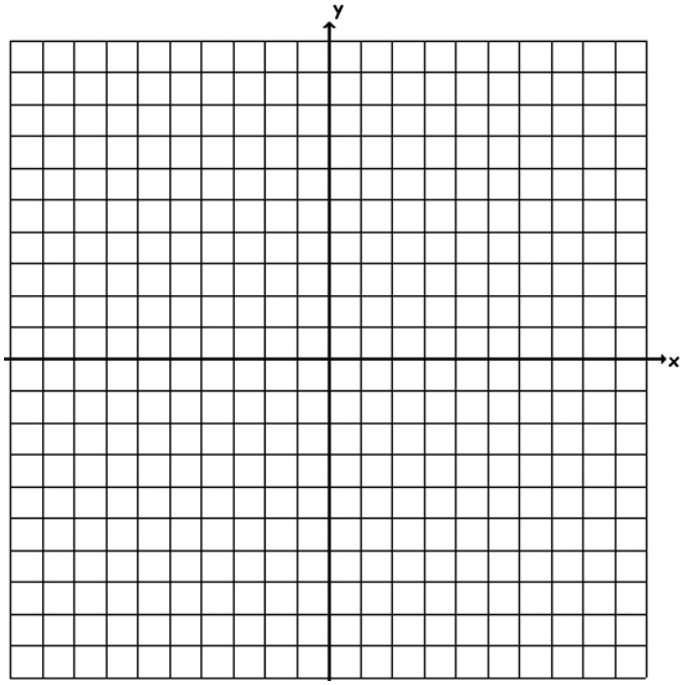


7. Compare and contrast the three graphs you have just drawn in questions 4, 5 and 6.

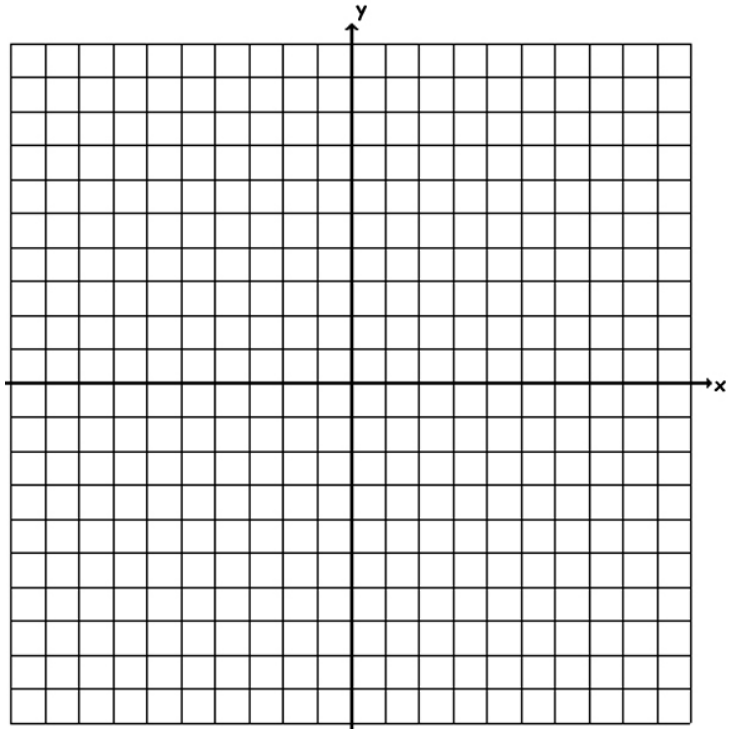
8. The points (2,3) and (7, −2) are two vertices (corner points) of a square.
a) What are the coordinates of the other two vertices? Find all possible answers
b) What is the area of the square?



9. Two vertices of a rectangle with area 24 square units are (5, −2) and (5, −5). If the other two vertices have both negative x and y coordinates, what are the coordinates of the other two vertices?



10. The vertices of a triangle are (−4, −2), (1, 3), and (6, −2).
a) Find the area of the triangle.
b) What is the length of the shortest side?

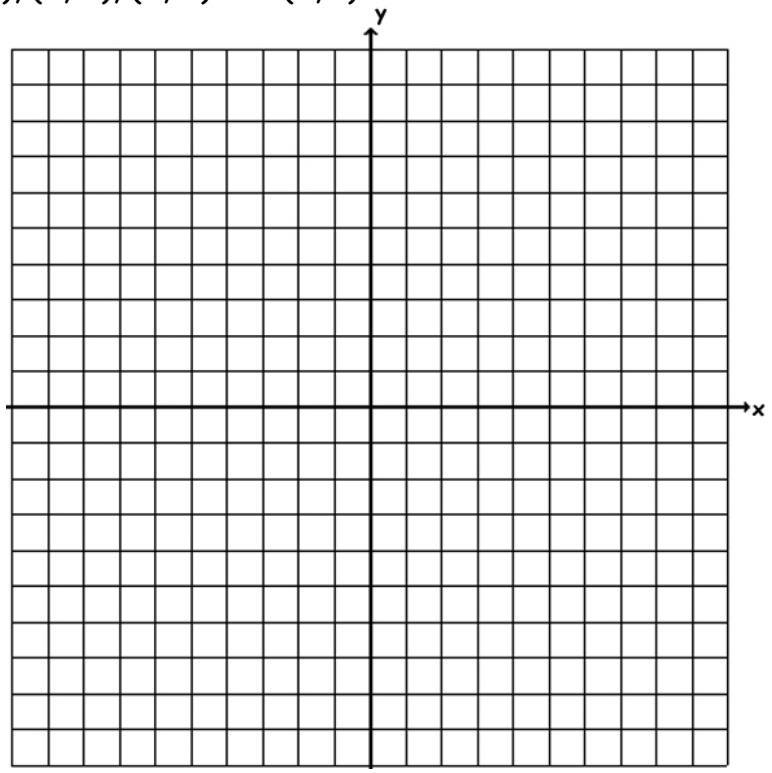


11. A quadrilateral has vertices at (−4, 1), (0, 4), (7, 4) and (3, 1).

a) What type of quadrilateral is this?

b) What is its area?

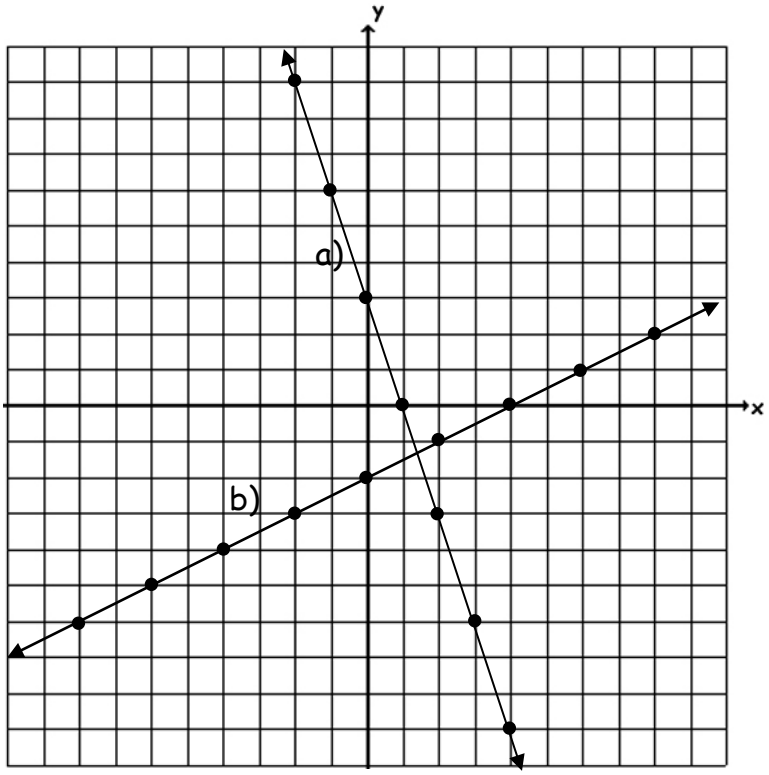
c) What is its perimeter?



12. Two relations are plotted. Determine their equations.

a)

b)



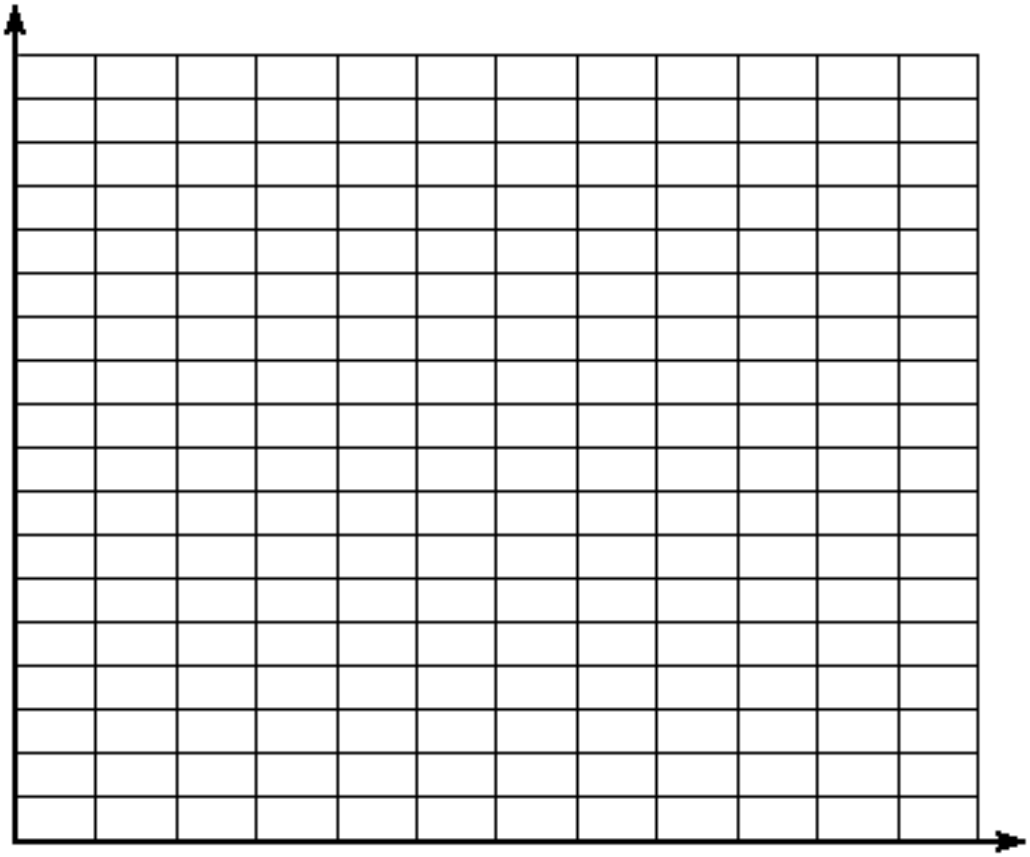
8-2 Graphing Data I (Line Graphs)

8-2 Graphing Data I (Line Graphs)

1. At Pasquale's Pizza cheese and tomato sauce is included on all pizzas. Here is a partial price list for a large pizza.

# of toppings	Price
1	$17
3	$21
6	$27

Now construct a graph for this data. Make sure to label your axes and show your scale.



a) How much would a large pizza with no toppings cost?_____

b) How much would a large pizza with 5 toppings cost?_____

c) How many toppings could you get for $34?_____

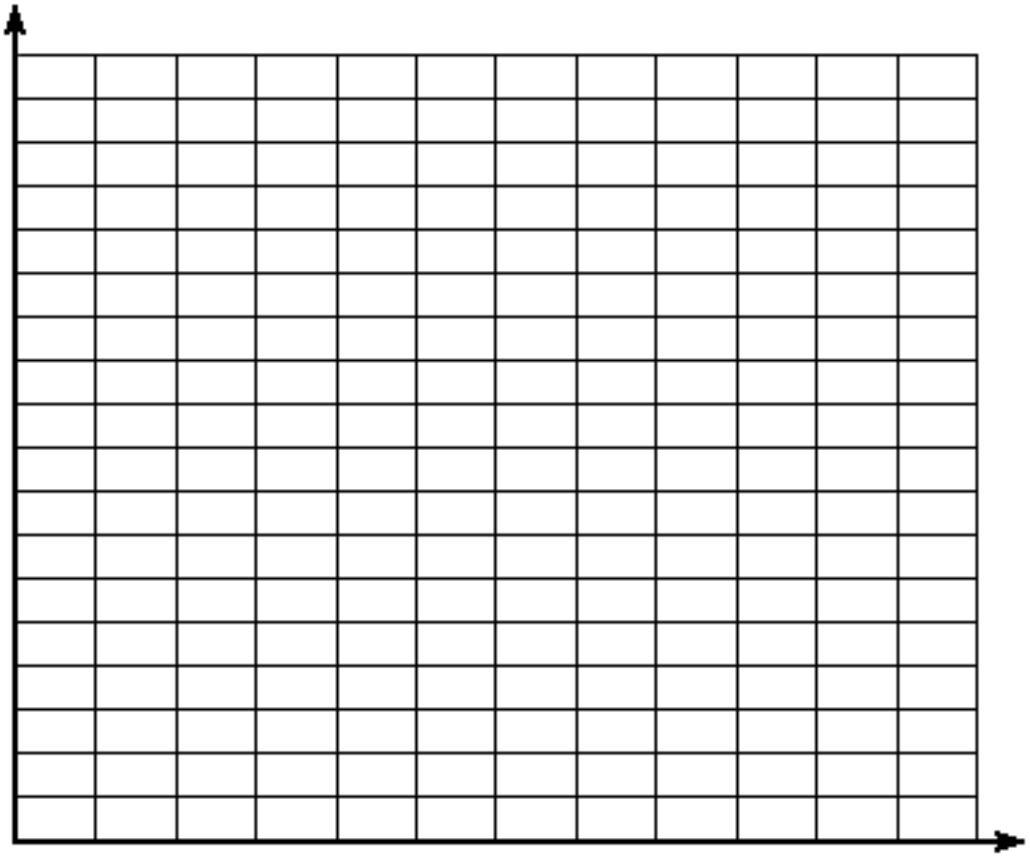
d) What is the price per topping?_____

e) Determine an equation for this relation: _____

2. Ivan Toksalotski was looking at his charges for text messaging on his last several phone bills. Here is what he found:

# of texts	cost
60	$12.00
25	$5.00
90	$18.00
10	$2.00

Construct a graph for this data. Make sure to label your axes and show your scale.



a) How much would it cost to send 80 texts?_____

b) How many texts could you send for $15?_____

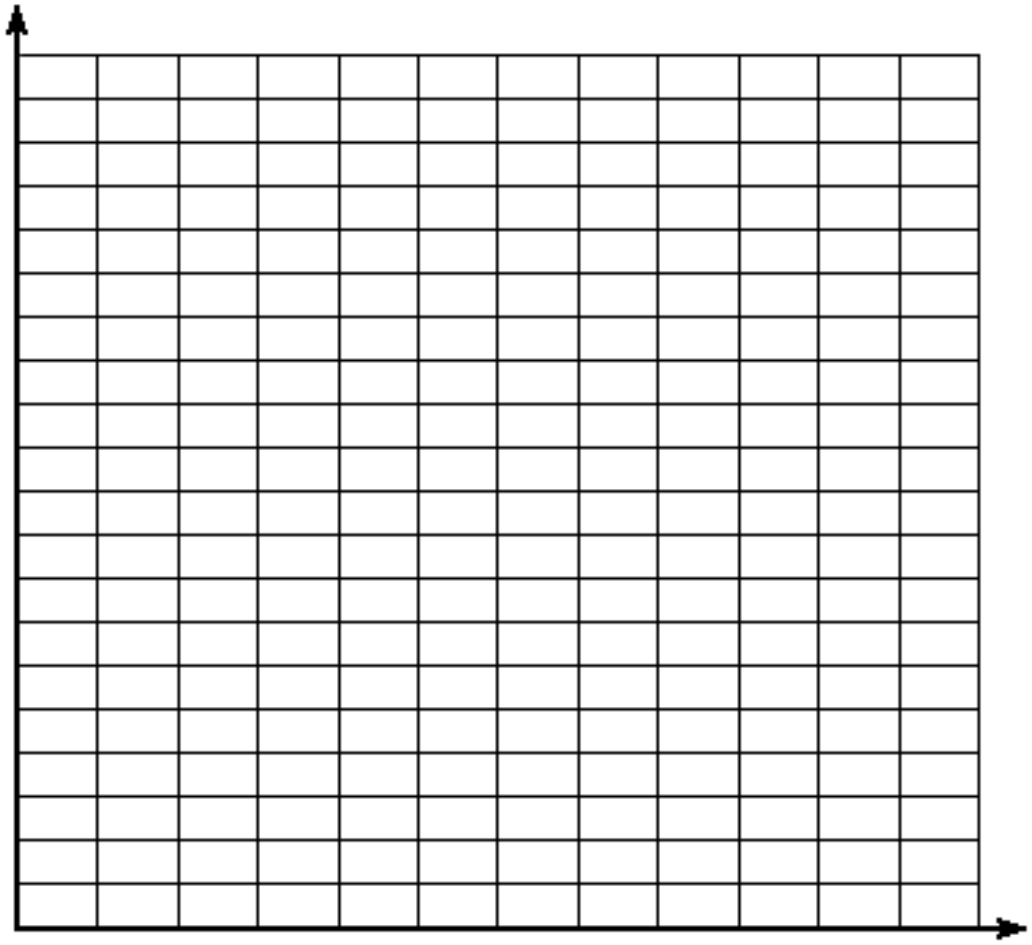
c) What is the price per text?_____

d) Determine an equation for this relation: _____

3. A watermelon was dropped off the top of a 200 m building. Its height above ground was measured at time intervals one second apart. Here is the data:

Height (m)	200	195	180	155	120	75	20
Time (s)	0	1	2	3	4	5	6

Construct a graph of height vs time. Make sure to label your axes and show your scale.



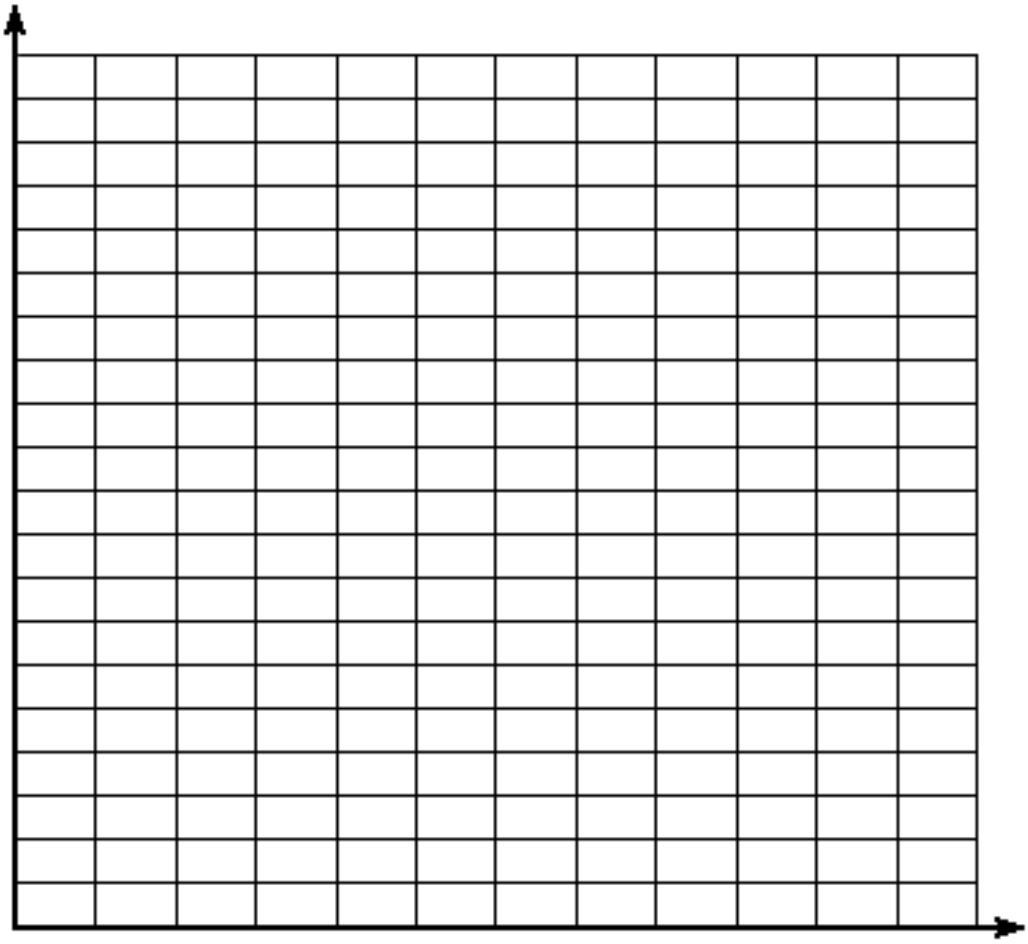
a) Is this graph a straight line? Why do you think this is?

b) Estimate to the nearest tenth of a second when the watermelon would hit the ground.

4. A water-balloon was shot up into the air and its height above ground was measured at time intervals one second apart. Here is the data:

Height (ft)	5	40	65	80	85	80	65	40	5
Time (s)	0	1	2	3	4	5	6	7	8

Construct a graph of height vs time. Make sure to label your axes and show your scale.

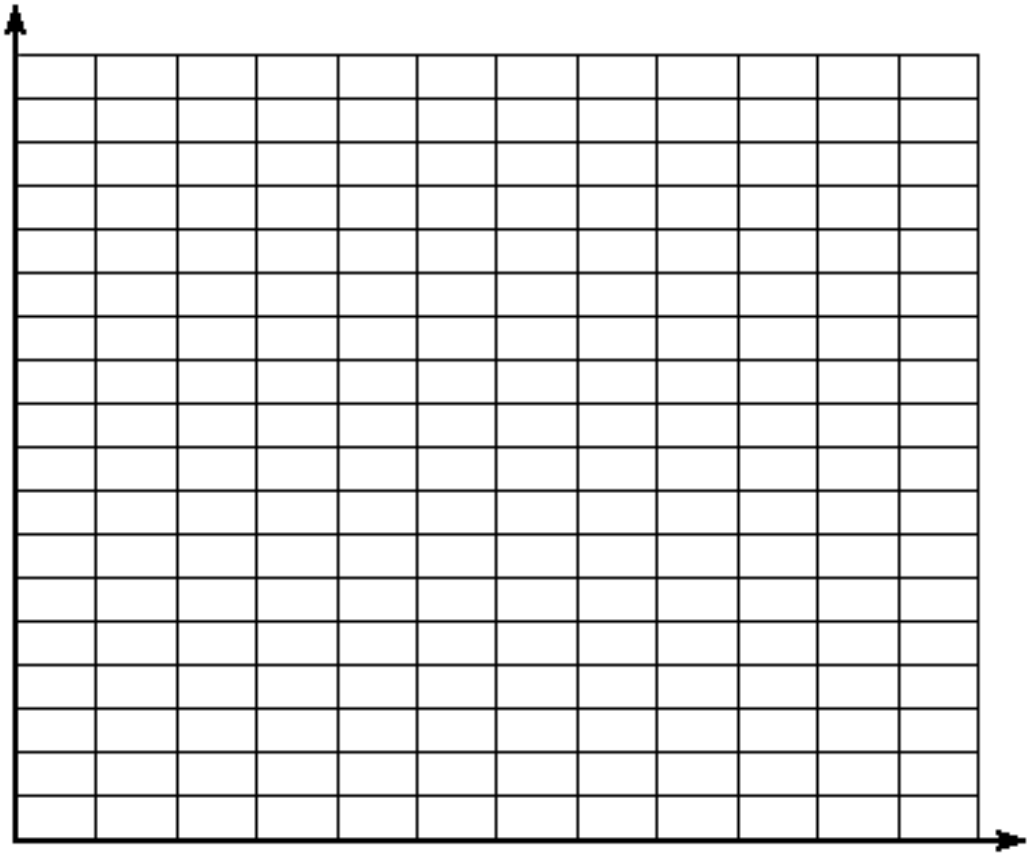


a) What shape is this graph?

b) What does the y-intercept (where the graph hits the y-axis) physically tell you about the water-balloon?
(The y-axis is actually the height or "h" axis in this case!)

5. The following data was collected for Vancouver. Graph the data on the grid below, with "Day Number" on the horizontal axis, and "Hours of Daylight" on the vertical axis.

Date	Day Number (n)	Hours of Daylight (y)
Jan 01	0	8.3
Jan 31	30	9.4
Mar 01	60	11.0
Mar 31	90	12.8
Apr 30	120	14.6
May 30	150	15.9
Jun 29	180	16.2
Jul 29	210	15.3
Aug 28	240	13.7
Sep 27	270	11.9
Oct 27	300	10.1
Nov 26	330	8.7
Dec 26	360	8.2



a) Approximately when was the longest day of the year (the day with the most hours of sunlight)?

b) Approximately when was the shortest day of the year (the day with the least hours of sunlight)?

c) One factor that affects a region's growing season is hours of daylight. Vancouver's growing season generally starts when there are 12 or more hours of daylight. From the graph predict the start and end date of the growing season in Vancouver.

d) How would the graph look different if the same data was collected in Mexico City? Draw a sketch of what you think it might look like.

e) How would the graph look different if the same data was collected in Sydney Australia? Draw a sketch of what you think it might look like.

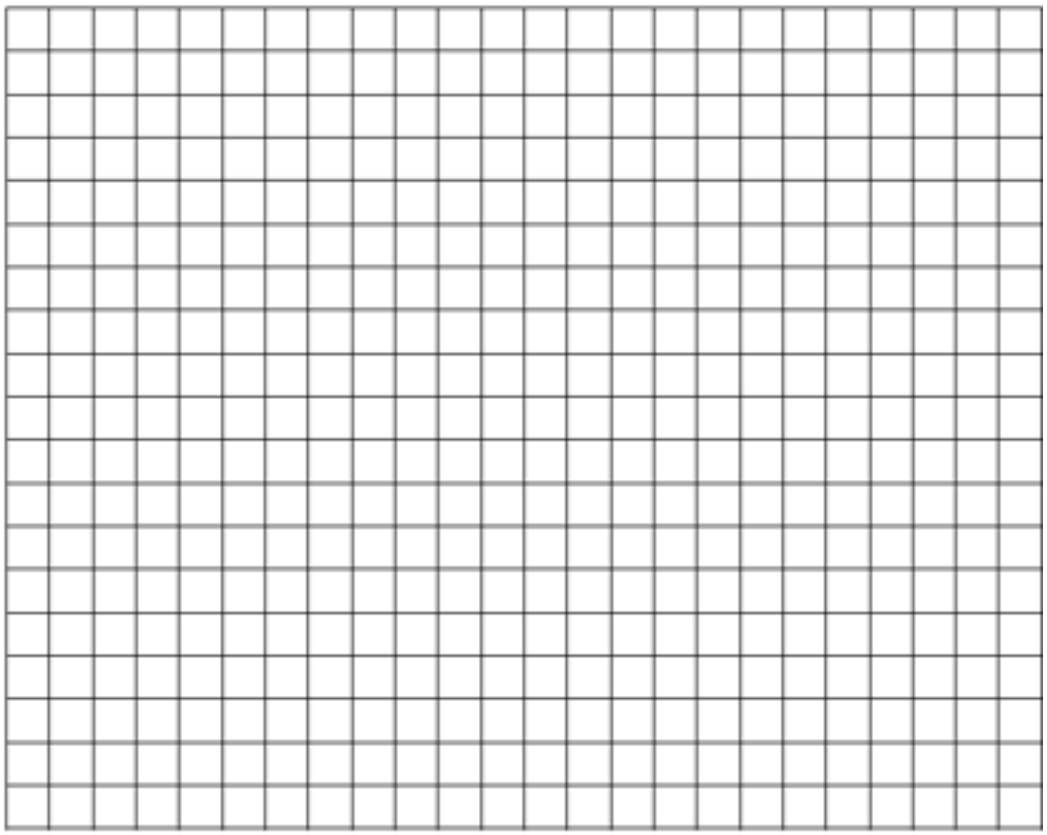
6. Discussion question: How can you tell if a relation is linear?

7.

World Population (billions)	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Year	*1800*	*1927*	*1960*	*1974*	*1987*	*1998*	*2011*

http://www.un.org/esa/population/publications

a) On the grid below, show this data in the most in the most useful way you can think of.



b) What trend, if any, can be seen from your graph?

c) Using your graph,
-Predict when the world population will reach 8 billion: _____
-Estimate when the world population was half of a billion (500 000 000): _____
-Estimate the world population in the year 1970: _____

2000: _____

2020: _____

8-3 Graphing Data II (Other Types of Graphs)

8-3 Graphing Data II (Other Types of Graphs)

For each set of data, show the best way (or ways) to represent it graphically. You may need extra space and/or extra graph paper. Some of the data sets contain more than one kind of information which needs to be shown, and some of the data sets contain more information than you might be able to graph.
Types of graphs include pie charts, pictographs, histograms, bar charts (single, double and multiple) as well as line graphs, and perhaps others.

1. TOP WORLDWIDE SMARTPHONE VENDORS 2016

Vendor	Market Share (%)
Samsung	22.2
Apple	16.8
Huawei	9.3
Lenovo	6.1
Xiaomi	5.8
LG	5.0
TCL	4.0
OPPO	3.9
BBK/VIVO	3.4
ZTE	3.1
Others	20.3
Total	100

http://www.smartphonemarketresearch.com/

2. BLOOD TYPE DISTRIBUTION

Blood Type (Donor)	% of Blood Type Amongst all Canadians
A+	36
A-	6
O+	39
O-	7
B+	7.6
B-	1.4
AB+	2.5
AB-	0.5

http://www.bloodservices.ca

3. Temperature and Rainfall Vancouver BC

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average high (°C)	6.8	8.4	10.6	13.5	16.8	19.6	22	22.3	19	13.9	9.3	6.8
Average low (°C)	2.7	3.4	4.6	6.5	9.5	12.2	14.1	14.4	11.6	8.2	4.8	2.8
Monthly rainfall (mm)	144	174	153	117	87	70	49	48	71	132	220	211

http://www.theweathernetwork.com/statistics/CABC0308

4. Population estimates by sex and age group as of July 1, 2011, Canada

Age group	Total	Male	Female
Total	34,482,779	17,104,098	17,378,681
0 to 4 years	1,921,203	982,889	938,314
5 to 9 years	1,823,983	938,803	885,180
10 to 14 years	1,899,661	975,748	923,913
15 to 19 years	2,196,437	1,123,767	1,072,670
20 to 24 years	2,402,234	1,234,223	1,168,011
25 to 29 years	2,419,280	1,227,544	1,191,736
30 to 34 years	2,348,086	1,173,463	1,174,623
35 to 39 years	2,290,396	1,149,025	1,141,371
40 to 44 years	2,396,726	1,206,180	1,190,546
45 to 49 years	2,750,685	1,384,979	1,365,706
50 to 54 years	2,668,169	1,333,326	1,334,843
55 to 59 years	2,354,191	1,161,120	1,193,071
60 to 64 years	2,038,290	998,378	1,039,912
65 to 69 years	1,534,466	744,151	790,315
70 to 74 years	1,142,574	538,828	603,746
75 to 79 years	918,295	415,433	502,862
80 to 84 years	703,048	293,347	409,701
85 to 89 years	439,034	157,271	281,763
90 to 94 years	179,895	52,717	127,178
95 to 99 years	48,557	11,338	37,219
100 years and over	7,569	1,568	6,001

http://www.statcan.gc.ca/daily-quotidien/110928/t110928a4-eng.htm

5. Population by Province and Territory (2015)

Province/Territory	Population (Thousands)
Nunavut	36.9
Yukon	37.4
North West Territories	44.1
Prince Edward Island	146.4
Newfoundland and Labrador	527.8
New Brunswick	753.9
Nova Scotia	943.0
Saskatchewan	1 133.6
Manitoba	1 293.4
Alberta	4 196.5
British Columbia	4 683.1
Quebec	8 263.6
Ontario	13 792.1
Total	**35 851.8**

http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm

6. Olympic Medals from Rio 2016

Country	GOLD	SILVER	BRONZE
United States of America	46	37	38
Great Britain	27	23	17
Peoples Republic of China	26	18	26
Russian Federation	19	18	19
Germany	17	10	15
Japan	12	8	21
France	10	18	14
Republic of Korea	9	3	9
Italy	8	12	8
Australia	8	11	10
Netherlands	8	7	4
Hungary	8	3	4
Brazil	7	6	6
Spain	7	4	6

7. **What do you usually eat for breakfast?**

Food group	Elementary			Secondary		
	Girls	Boys	All students	Girls	Boys	All students
	%					
Grain products	73.4	74.6	74.0	67.3	65.0	66.2
Milk products	46.1	49.8	47.9	44.6	48.5	46.6
Fruits and vegetables	28.8	22.7	25.8	28.8	19.4	24.1
Meat and alternatives	18.1	25.0	21.5	15.1	21.7	18.4
Other	11.9	12.8	12.3	12.3	14.2	13.3
No breakfast	10.9	7.9	9.4	19.1	17.3	18.2

Source: Statistics Canada, Census at School, 2010/2011.

http://inflationdata.com/inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp

8-4 Probability

8-4 Probability

1. A single six-sided die is rolled. Calculate the following probabilities:

a) P(4) = _____ b) P(odd number) = _____ c) P(2 or 3) = _____

d) P(less than 5) = _____ e) P(not 2) = _____ f) P(at most 6) = _____

g) P(7) = _____ h) P(at least 3) = _____ i) P(prime number) = _____

2. A single card is drawn from a standard 52 card deck. Calculate the following probabilities:

a) P(black card) = _____ b) P(diamond) = _____ c) P(King) = _____

d) P(Ace of spades) = _____ e) P(red 9) = _____ f) P(face card) = _____

g) P(not a Queen) = _____ h) P(3 or 5) = _____ i) P(spade of clubs) = _____

3. A bag contains 20 marbles, of which there are 7 black marbles, 5 red marbles, 6 green marbles, and the rest white marbles. If a marble is randomly pulled out of the bag without looking, calculate the following probabilities.

a) P(black) = _____ b) P(white) = _____ c) P(red) = _____

d) P(green or red) = _____ e) P(purple) = _____ f) P(not green) = _____

8-5 Independent Events

8-5 Independent Events

1. A six-sided die is rolled and then a coin is flipped. Draw a tree diagram to represent this experiment.

a) P(2,Heads) = _____ b) P(odd, Tails) = _____ c) P(more than 4, Heads) = _____

d) How could you have calculated these answers without drawing the tree diagram?

2. A card is drawn from a standard deck of cards, and then a six-sided die is rolled. Calculate the following probabilities:

a) P(red, 2) = _____ b) P(queen, 3) = _____ c) P(spade, 3 or 4) = _____

d) P(face card, odd) = _____ e) P(King or Ace, prime) = _____

f) P(not queen, not 6) = _____ g) P(Black Jack, at most 4) = _____

3. The Canucks have a 60% or $\frac{3}{5}$ chance of winning each game they play, independent of each other. Assume ties are not allowed.

a) Draw a tree diagram to show the possibilities for the results of the Canucks playing 3 games.

b) What is the probability that they win all 3?

c) What is the probability that they lose all 3?

d) What is the probability that they win the first two and then lose the third?

e) What is the probability that they win 2 and lose 1 (in any order)?

f) What is the probability that they lose the first game, win the second, and then lose the third?

4. Jan and Fred are playing a game called "High Card." Each player has three cards in front of them, face down. Then, at the same time, they both flip over one card. Whoever has the highest card wins. Jan's cards are a 5, a 9, and a Queen; Fred has a 6, an 8, and an Ace. Draw a tree diagram to show the possible outcomes of one game.

a) What is the probability Jan wins if she plays the 9?

b) What is the probability Fred wins if he plays the Ace?

c) What is the probability Fred wins if he plays the 6?

d) What is the probability Jan wins if she plays the 5?

e) What is the probability Jan wins?

f) What is the probability Fred wins?

5. A fair coin is flipped 4 times. Draw a tree diagram to show the possible outcomes.

Find the following probabilities:

a) P(exactly 1 Head)

b) P(exactly 2 Heads)

c) P(all Tails)

d) P(at least one Head)

6. On a certain chocolate bar there is a contest on the wrapper, where there is a 1 in 4 chance of winning a prize.

a) If I buy 4 chocolate bars, does that guarantee I will win a prize? Explain.

b) If I buy two chocolate bars, what is the probability that I will win a prize on the first one and not win a prize on the second one?

c) What is the probability that I will win exactly one prize if I buy 2 chocolate bars?

d) What is the probability that I will win exactly one prize if I buy 3 chocolate bars?

e) What is the probability that I will not win a prize if I buy 2 chocolate bars?

f) What is the probability that I will not win a prize if I buy 3 chocolate bars?

g) What is the probability that I will not win a prize if I buy 4 chocolate bars?

h) What is the probability that I will win at least one prize if I buy 4 chocolate bars?