

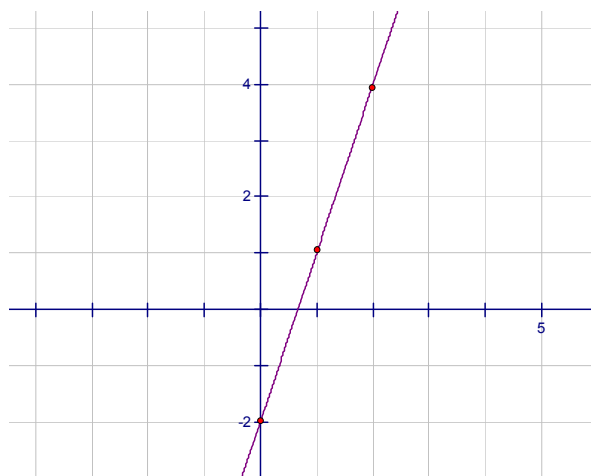
Unit/Chapter: Linear Relations Topic: Linear and non Linear Relations

📌 homework check: NPM 9 p. 169 # 3 – 6, 8, 9, 13, 15, 16

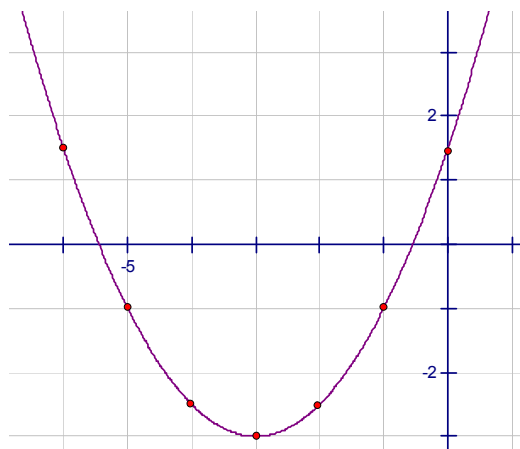
📌 note: Linear and Non Linear Relations

In grade 9, the relations generally belong to one of four types.

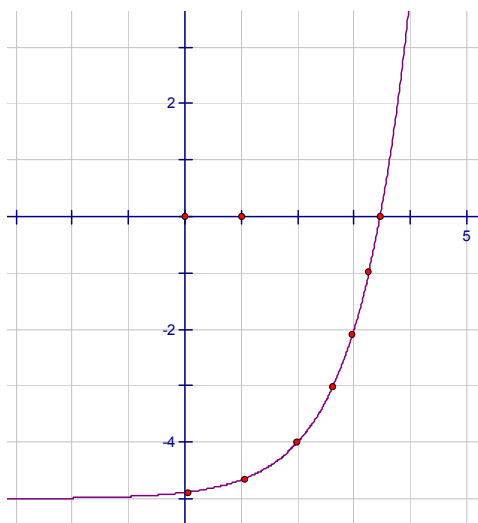
Linear



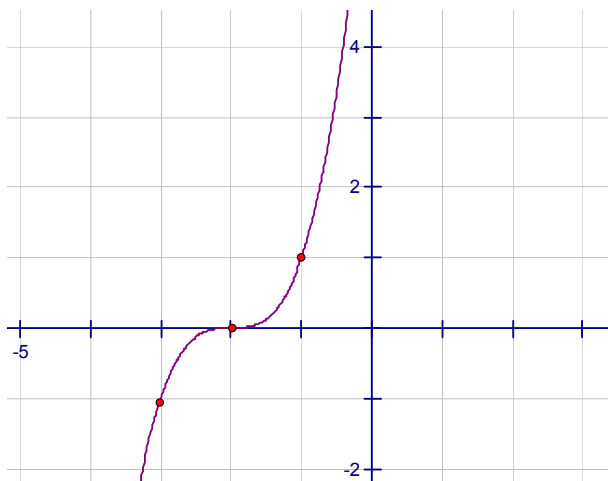
Quadratic



Exponential



Cubic



📌 homework assignment: All in the Family Assignment

All in the Family: Classifying Functions

Knowledge	43	
Application	17	
Communication		

PART A: Knowledge

1. The equations below represent 4 different shapes/families of graphs. Use a graphing calculator to sketch the graph of each relation given. Use one graph for each family or group and be careful to label each of the relations using the correct equation. **(16 marks)**

$$y = x^2$$

$$y = x^3 + 4$$

$$y = -3x + 1$$

$$y = 2^x$$

$$y = \frac{1}{3}x$$

$$y = \left(\frac{1}{3}\right)^x$$

$$y = x^3 - 2$$

$$y = (x - 2)^2 - 3$$

$$y = -2x - 1$$

$$y = -3x^2$$

$$y = 4^x$$

$$y = \left(\frac{1}{4}\right)^x$$

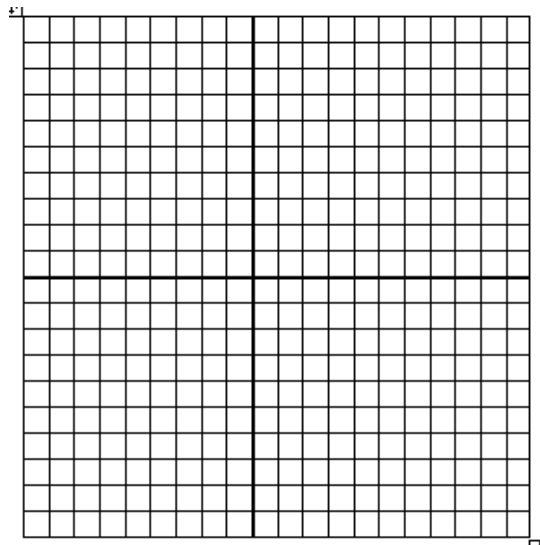
$$y = x^3 + 2$$

$$y = (x + 3)^3 - 5$$

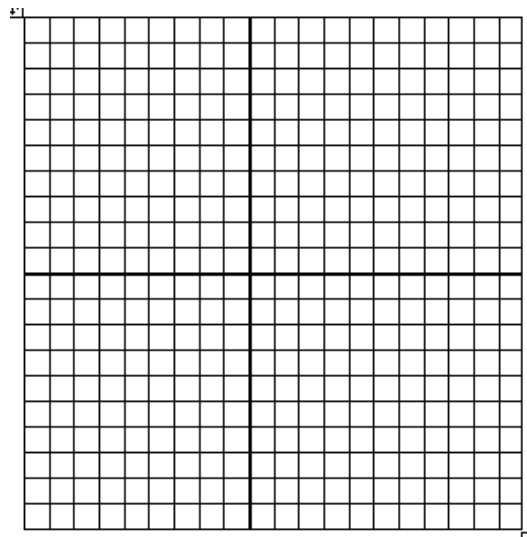
$$y = 3x + 2$$

$$y = -2x^2 + 3$$

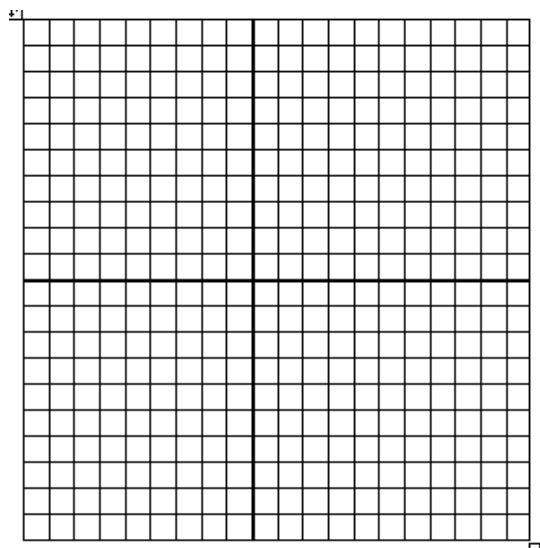
Lines:



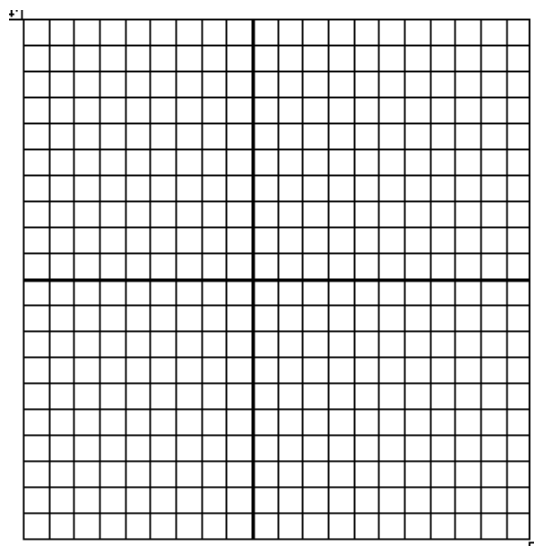
Quadratics:



Cubics:



Exponential:



2. a) Carefully examine the 4 families of graphs you sketched.
- b) Write the equations of any **3 relations that are linear** in the space provided.

(3)

- c) Write the equations of any **4 relations that are not linear** in the space provided.

(4)

- d) Compare the equations of the lines with the equations of the others. **How are the equations of the lines different from the equations of curves?**

(2)

3. Complete this statement about how you would recognize an equation that graphs a line. Pay particular attention to the exponent of the x . **“An equation graphs a line if...”**

(2)

4. a) Graph these equations that contain a y variable only on the grid provided. You may need to use a table of values. Remember that $y = 5$ means that the y column will always be equal to 5 no matter what values you pick for x . **(5 marks)**

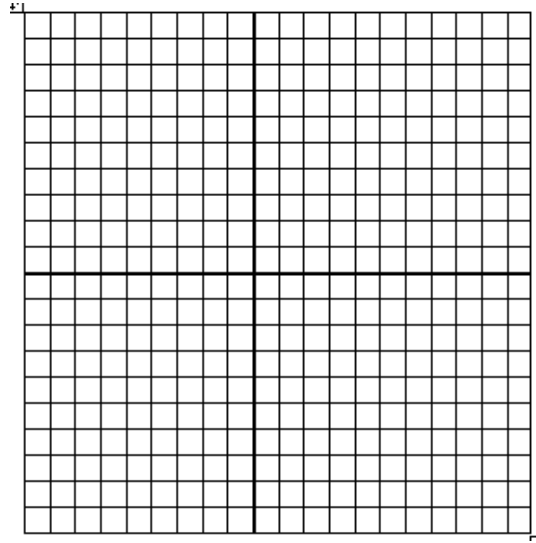
$$y = 5$$

$$y = -5$$

$$y = -3$$

$$y = 0$$

$$y = 3$$



- b) Are these graphs linear?

(1)

- c) What special characteristic do each of the lines possess?

(1)

- d) Make a generalization about the appearance of a graph if its equation has a y variable only.

(1)

e) Graph these equations below that contain an x variable only. You may need a table of values. **(5 marks)**

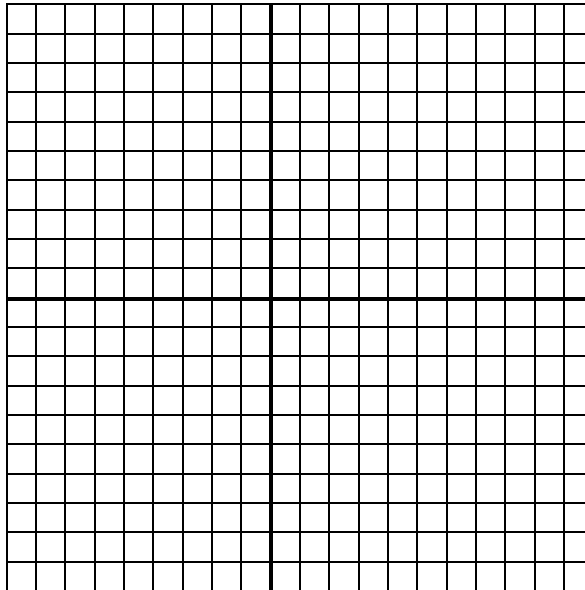
$x = -1$

$x = -3$

$x = 2$

$x = 3$

$x = 5$



f) Are these graphs linear?

(1)

g) What special characteristic do each of the lines possess?

(1)

h) Make a generalization about the appearance of a graph if its equation has a y variable only.

(1)

PART B: APPLICATION

5. Use your results to predict the nature of each graph below. Place the equation in the correct family of lines, parabolas, exponential functions, or cubic. **(10 marks)**

$y - x = 0$

$y = 1 - x^2$

$y - 2x^2 = 3$

$x + y + 1 = 0$

$y - x^3 = 5$

$y = \left(\frac{2}{5}\right)^x$

$0 = 2x + y - 3$

$y = 5^x$

$y = -3x^3$

$y = x - 2$

Linear	Quadratic	Exponential	Cubic

6. a) Examine the exponents of the different types of equations that graph non-linear relations. **Is there a link between the value of the exponent and the shape of the graph? Explain this link.**

(4)

7. Write 3 equations that graph curves that **do not belong** to any of the types examined today.

(3)