## Note: 3.1 Investigating Non-Linear Relationships

Line of Best Fit: a line drawn through a scatter plot when the data appears to follow a _____ relation.
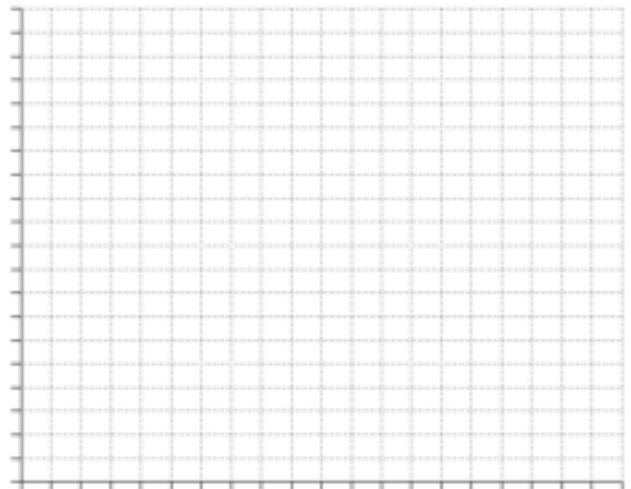
Curve of Best Fit: a smooth _____ that represents the "_____" of the data. Non-linear data will have a non-linear curve of best fit.

Ex1. Determine whether the data represents a linear or non- linear relation, then draw the line or curve of best fit.
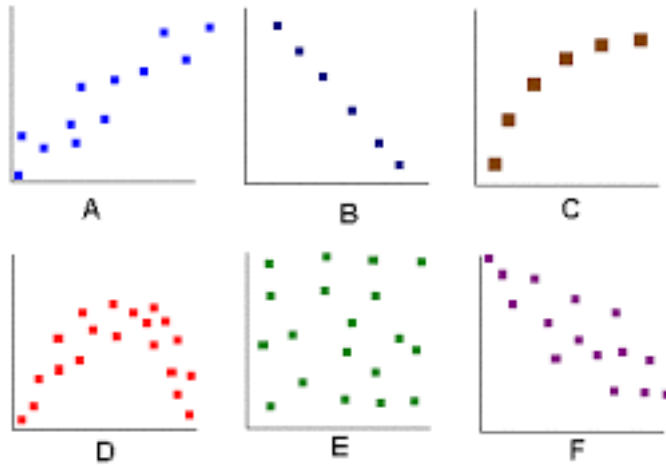
Ex. 2 What is the relationship between the radius of a circle and its area?

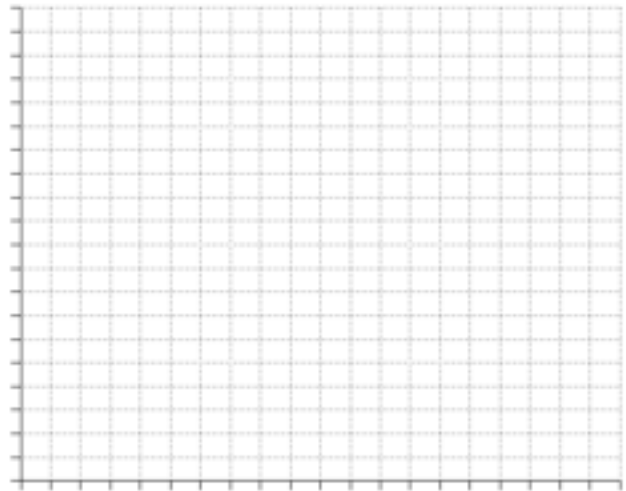| Radius	Area
0	
1	
2	
4	
5	

Ex. 3 Toothpicks can be arranged to create equilateral triangles as shown.

a)Complete the table and create a scatter plot for the data.

| side length	Total toothpicks
0	
1	
2	
4	
5	

b) Describe the relation

c) Draw a curve of best fit

d) Use your model to predict the number of toothpicks needed to build a triangle with a side length of 6 toothpicks.

Ex. 4 A toy rocket is launched straight up. The table shows its height, h, in metres above the ground and t seconds.

a)Create a scatter plot of the data.

side length	Total toothpicks
0	
1	
2	
4	
5	
6	
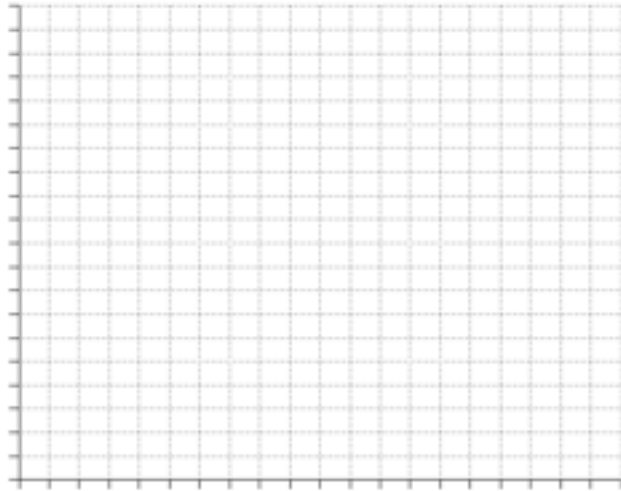
b) Describe the relation

c) Draw a curve of best fit

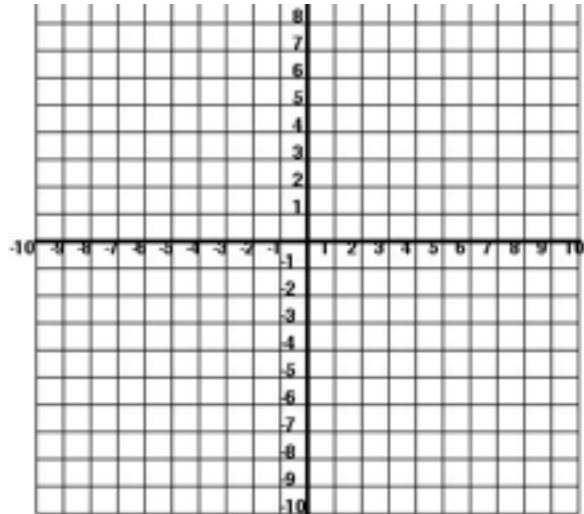d) Use your model to predict the height of the rocket at 8 seconds.

e) Describe how the graph would change if the rocket stayed in the air for 15 seconds.

Graphs of Quadric Relations
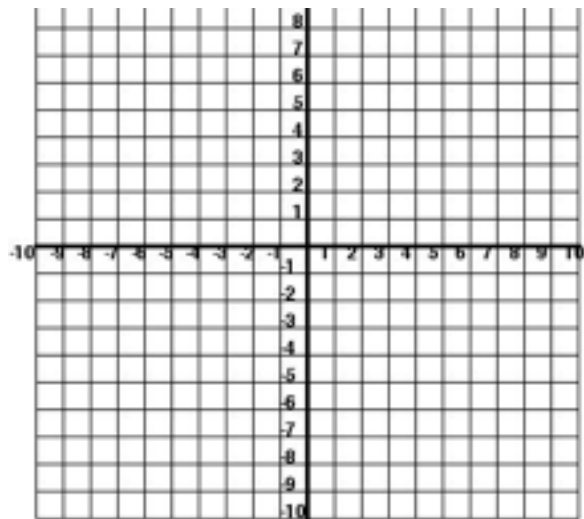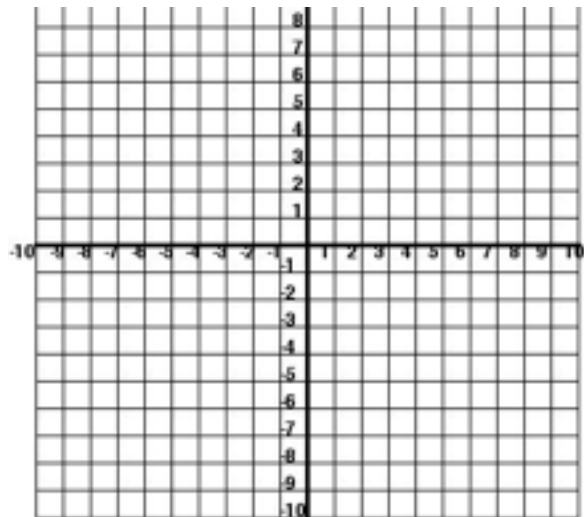Ex. 5 Complete the table of values and graph each relations.
a) $y = x^2$

x	y

b) $y = 5 - x^2$

x	y

c) $y = 2x^2 - 3x - 4$

x	y

What do all these graphs have in common?

These are the graphs of _____ relations. The graph is called a _____.

Ex. 6 Use graphing technology to graph each of the following.
a) y = -2x2 + x - 3
b) y = x2 + 7x + 3
c) y = x2 - 4x + 4