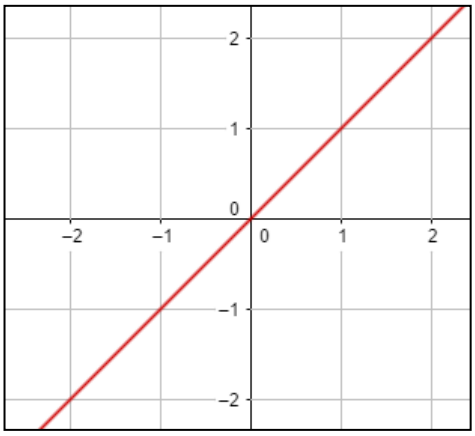
Name: _____ Period: _____ Date: _____

Linear, Quadratic and Exponential Models Guided Notes

A **linear model** represents a linear equation of the form:

$$f(x) = ax + b$$

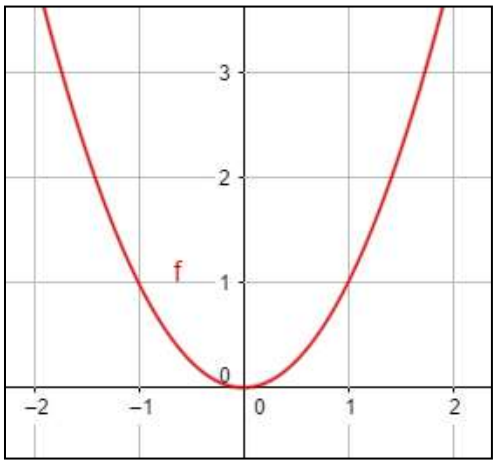
The graph of a linear model represents a straight line.



A **quadratic model** represents a quadratic equation of the form:

$$f(x) = ax^2 + bx + c$$

The graph of a quadratic model represents a parabola or a U shaped curve.



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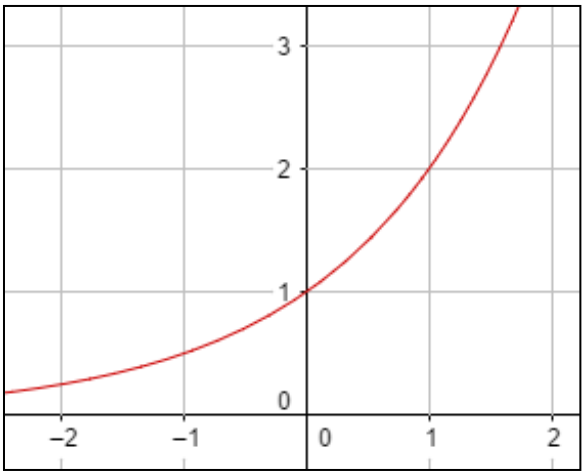
Linear, Quadratic and Exponential Models Guided Notes

An **exponential model** represents an exponential equation of the form:

$$f(x) = a^x$$

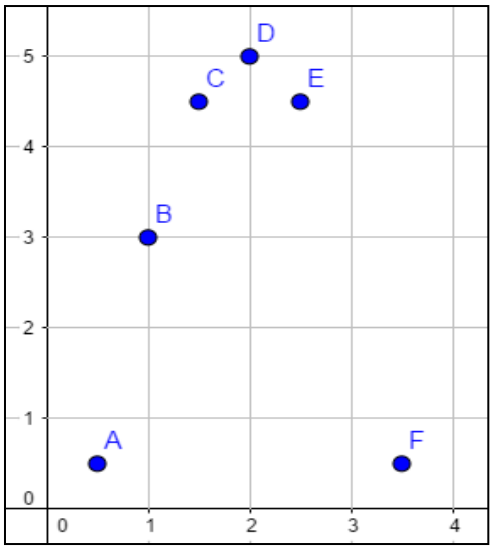
The graph of an exponential model represents a decreasing or increasing curve.



Problem 1: Which model best represents the data set shown below?

(0.5,0.5) , (1,3), (1.5,4.5) , (2,5) , (2.5, 4.5) , (3.5, 0.5)

If we graph these points, we see an inverted U-shaped curved which represents a quadratic equation. So the data set represents a **quadratic model**.



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Linear, Quadratic and Exponential Models Guided Notes

Choosing the Best Model

If we are given a table of x-y values, we can determine whether the table represents a linear, quadratic or exponential models by using the following rules:

- In a linear model, there is a constant difference between the y-values for each increase in value of x.
- In a quadratic model, there is a common difference between the differences of successive y-values.
- In an exponential model, the y-values have a common ratio.

Problem 2: Which kind of function best models the data represented in the table shown below?

There is a constant difference between y-values with the increase in x-values:

$$7 - 5 = 5 - 3 = 2$$

$$9 - 7 = 11 - 9 = 2$$

So the table represents a **linear model.**

x	y
1	3
2	5
3	7
4	9
5	11