



Algebra1Coach.com

Linear, Quadratic and Exponential Models

Unit 9 Lesson 7

LINEAR, QUADRATIC AND EXPONENTIAL MODELS

Students will be able to:

Understand the linear, quadratic and exponential models using data set and graphs

Key Vocabulary:

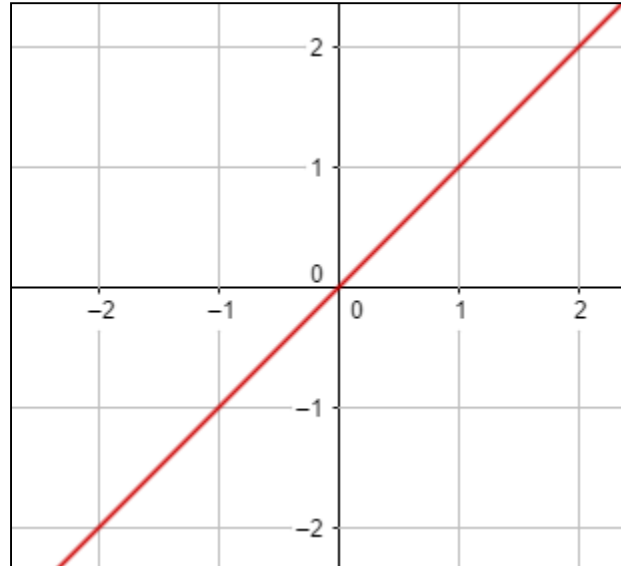
- Linear Model
- Quadratic Model
- Exponential Model

LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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

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

The graph of a linear model represents a straight line.

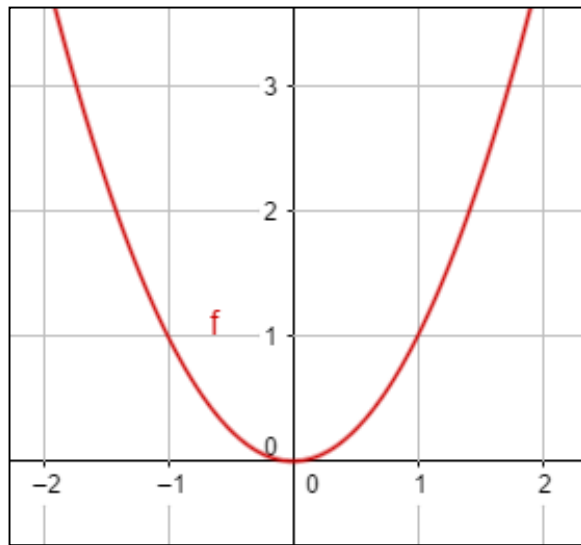


LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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.

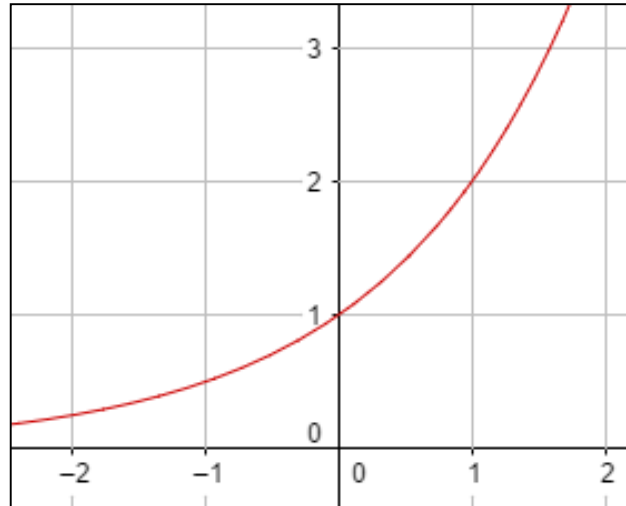


LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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.



LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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

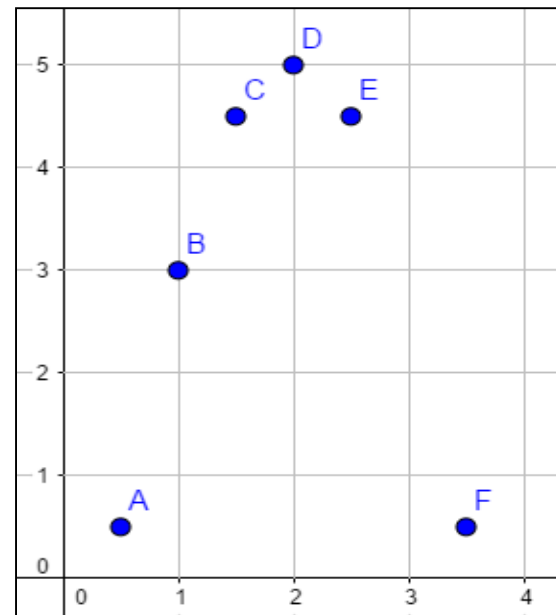
$(0.5, 0.5)$, $(1, 3)$, $(1.5, 4.5)$, $(2, 5)$, $(2.5, 4.5)$, $(3.5, 0.5)$

LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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**.



LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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.

LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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

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

LINEAR, QUADRATIC AND EXPONENTIAL MODELS

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:

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

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

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

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

