


Rigorous Lessons

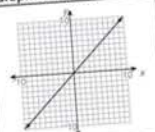

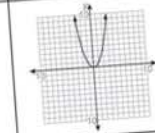

Rigorous content meets the demands of the standards and exam. Questions range in difficulty, with many Depth of Knowledge (DOK) levels 2 and higher.

LESSON 2  Choosing Appropriate Functions

F-LE.A.1b, c

A Chart of Parent Functions

Functions can be recognized by key features of their graphs. This chart shows a summary of some function equations, their parent graphs, and their key features.

Parent Function	Graph of Parent Function	Key Features
Linear $f(x) = x$		<ul style="list-style-type: none"> Graph is a straight line Average rates of change per unit interval are constant Always has one y-intercept for non-vertical lines
Absolute Value (Piecewise) $f(x) = x $		<ul style="list-style-type: none"> Graph is a V-shape Has a vertex, or minimum or maximum point Average rates of change per unit interval are constant for all points on the same side of the vertex Always has one y-intercept
Quadratic $f(x) = x^2$		<ul style="list-style-type: none"> Graph is a U-shape Has a vertex Average rates of change per unit interval differ Always has one y-intercept
		<ul style="list-style-type: none"> Shape shows growth (as x increases, y increases) or decay (as x increases, y decreases)

Try this sample question.

S-1 Corbin started a job at the beginning of the year. He gets paid \$40,000 for the year. Corbin expects to earn a 4% pay increase each year he is at this job. Which type of function is best used to predict the amount of pay Corbin can expect to get during the next few years?

- A linear function
B absolute value function
C quadratic function
D exponential function

A function that models growth by a constant factor, 4%, best models this situation. The change in pay from one year to the next can be determined by multiplying the previous year's pay by the pay increase rate. Exponential models show this type of growth. Choice D is correct.

Some functions can be identified by analyzing rates of change per unit intervals in a table of values. To analyze rate of change in an x - y table where the x -values increase by 1, compare the change in consecutive y -values.

- If the **first differences** in y -values are constant, then the data set could model a linear function. For example:

x	y	Difference between y -values
0	3	
1	9	$9 - 3 = 6$
2	15	$15 - 9 = 6$
3	21	$21 - 15 = 6$
4	27	$27 - 21 = 6$

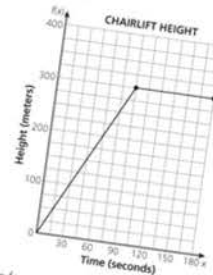
- If the **second differences**, or differences between the differences in y -values, are constant, then the data set could model a quadratic function. For example:

x	y	Difference between y -values	Difference between differences between y -values

A unit interval is measured by an x increase of 1.

Read this problem. Write your answers.

- 5 The graph below shows the relationship between the height of a chairlift, in meters, and the time, in seconds, the chairlift is moving over a 180-second period.



Write a piecewise function to represent the situation modeled by the graph. Show your work.