Can We Predict Stock Values?

Functions help us understand how one quantity changes with respect to another. This is especially important when our money is involved. Today we're going to study the value of a stock in a large sportswear corporation over a one-month period.
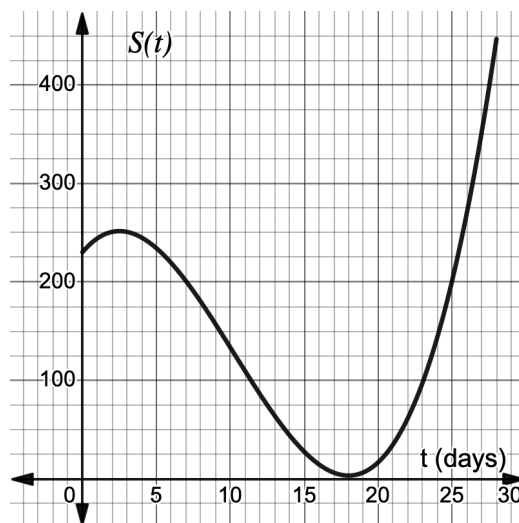
1. The table shows data for the value of a stock on the tth day of February.

t (day)	$S(t)$ (value)
0	$230
3	$250.70
6	$219.20
9	$157.10
12	$86
15	$27.50
18	$3.20
21	$34.70
24	$143.60
27	$351.5

   a. Is there a linear relationship between the day and the value of the stock? How do you know?

   b. Is there a quadratic relationship between the day and the value of the stock? How do you know?

2. A graph of S is shown.
   a. Estimate the first time that the value of the stock starts to decrease.

   b. Does the value of the stock ever reach $0? Explain.

   c. On which day during this 28-day period is the value of the stock the highest? What is the value of the stock on that day?

3. Is the rate of change of S increasing or decreasing over the interval [3,9]? How can you tell based on the graph?

4. Use the table to calculate the average rate of change of S on the interval [3,6] and on the interval [6,9]. Were you correct?

5. For the first 20 days of February, use the graph to estimate the day on which the value of the stock changes the fastest.

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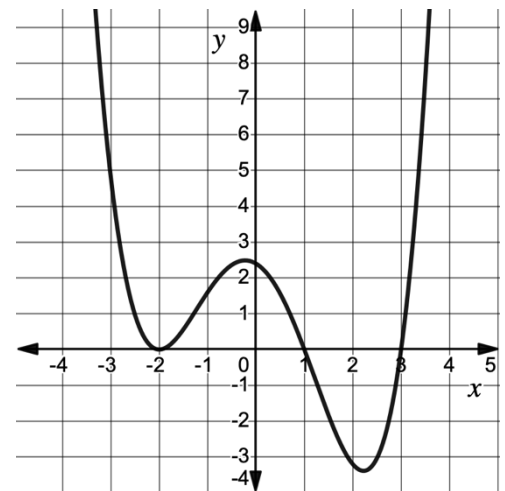# Lesson 2.1 – Polynomial Functions and Rates of Change

QuickNotes

Check Your Understanding

1. Selected values of a polynomial function f are given. Determine the degree of the polynomial.

x	-2	0	2	4	6	8
$f(x)$	45	5	-3	69	653	2565

2. The graph of a quartic polynomial $y = f(x)$ is shown.
   a. Determine the number of x-intercepts of f.

   b. Determine the number of relative minima and label them.

   c. Determine the number of relative maxima and label them.

   d. How many times does the graph of f change concavity?
   e. Label the absolute minimum A, or explain why this value does not exist.

   f. Label the absolute maximum B, or explain why this value does not exist.

3. A polynomial function g has x-intercepts at $x = 0$ and $x = 4$. Which of the following statements must be true?
   A) g is a quadratic function
   B) g must change concavity on [0,4]
   C) g has an absolute maximum or minimum at $x = 2$
   D) g has a relative maximum or minimum on the interval [0,4].

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