# APPC Lesson 1.6 Homework

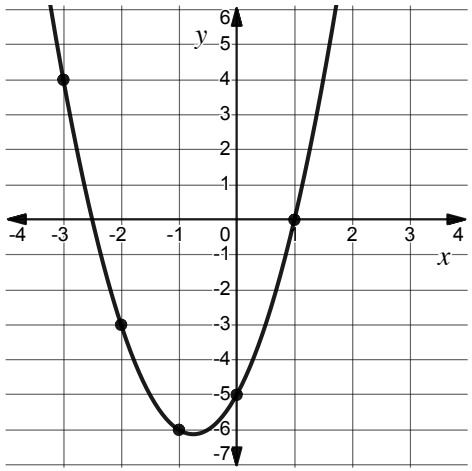
Name _____

1. Selected values of a function $h$ are given in the table.

| $x$ | $-3$ | $-1$ | $1$ | $3$ | $5$ | $7$ |
|---|---|---|---|---|---|---|
| $h(x)$ | $18$ | $-12$ | $-29$ | $-33$ | $-24$ | $-2$ |

Based on the information in the table, does $h$ appear to be a linear function, a quadratic function, or neither? Give a reason for your answer.

2. The graph of a quadratic function, $f$, is shown.




a. Find the average rate of change of $f$ on the interval $[-3, -2]$.

b. Find the average rate of change of $f$ on the interval $[-2, -1]$.

c. Find the average rate of change of $f$ on the interval $[-1, 0]$.

d. Find the average rate of change of $f$ on the interval $[0, 1]$.

e. Show that the rate of change of the average rates of change of $f$ is constant.

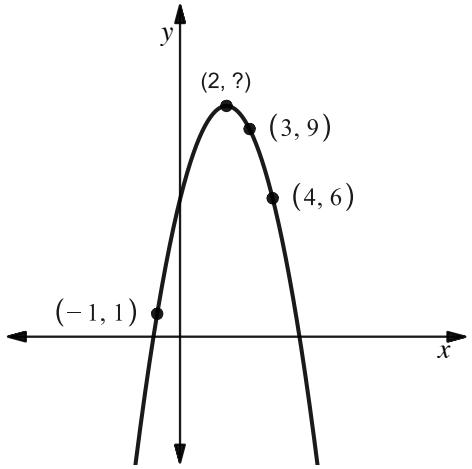
3. The average monthly rainfall, in inches, for Fresno, California can be modeled by a quadratic function $C$, where $C(m)$ represents the average rainfall in the mth month of the year. If $C(1) = 2.16, C(5) = 0.39$ and $C(10) = 0.65$, is the rate of change of the average rates of change of $C$ positive or negative? How do you know?

4. Consider the graph of $f(x) = -(x+7)^2 + 5$ . Is the rate of change of $f$ increasing or decreasing? Explain.

5. The graph of a parabolic function, $g$ , is shown.

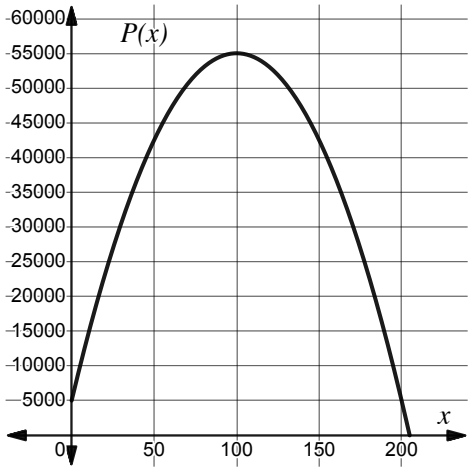
a. Find the $y$ -coordinate of the vertex of $g$ .

b. Find $g(6)$ .



6. After doing some market research, Crunchy Cookie Inc. has found that their profit on cookies after spending $x$ amount on advertising can be modeled by $P(x) = 5000 + 1000x - 5x^2$ . Both $x$ and $P(x)$ are measured in thousands of dollars.

a. Describe how the change in profit for each additional dollar spent on advertising is changing.




b. Find the average rate of change in Crunchy Cookie Inc.'s profit between $x = 50$ and $x = 100$ . Indicate proper units.

c. Find the average rate of change in Crunchy Cookie Inc.'s profit between $x = 100$ and $x = 150$ . Indicate proper units.

d. Without actually doing the calculation, can you predict the average rate of change in Crunchy Cookie Inc.'s profit between $x = 150$ and $x = 200$ ? Explain your approach.

e. Is each dollar spent on advertising equally well spent? Explain.

7. The graph of a quadratic function $y = f(x)$ passes through $(5, 1), (7, k)$, and $(9, 26)$ . The average rates of change over equal intervals of size 1 of $f$ are changing at a constant rate of $1.5$ . Find the value of $k$ .