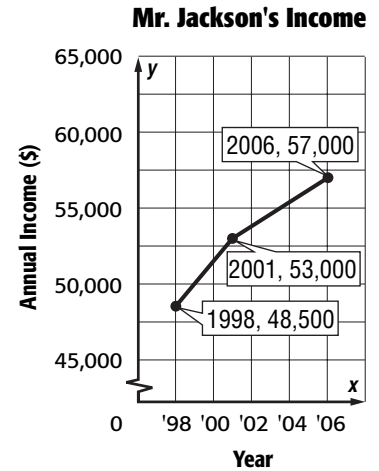


# 4-3 Study Guide and Intervention

## Rate of Change

To find the rate of change between two data points, divide the difference of the  $y$ -coordinates by the difference of the  $x$ -coordinates. The rate of change between  $(x_1, y_1)$  and  $(x_2, y_2)$  is  $\frac{y_2 - y_1}{x_2 - x_1}$ .

**Example** **INCOME** The graph shows Mr. Jackson's annual income between 1998 and 2006. Find the rate of change in Mr. Jackson's income between 1998 and 2001.



Use the formula for the rate of change.

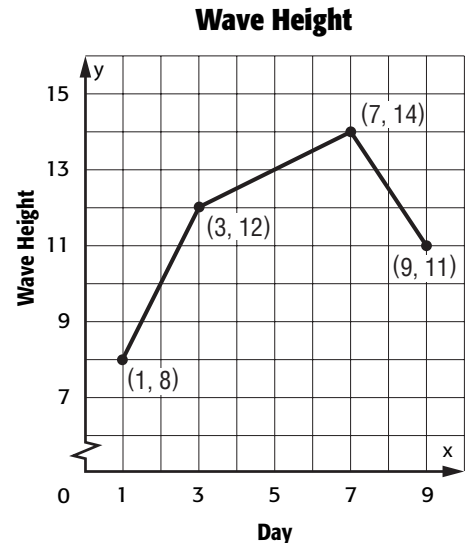
Let  $(x_1, y_1) = (1998, 48,500)$  and  $(x_2, y_2) = (2001, 53,000)$ .

$$\begin{aligned} \frac{y_2 - y_1}{x_2 - x_1} &= \frac{53,000 - 48,500}{2001 - 1998} && \text{Write the formula for rate of change.} \\ &= \frac{4,500}{3} && \text{Simplify.} \\ &= \frac{1,500}{1} && \text{Express this rate as a unit rate.} \end{aligned}$$

Between 1998 and 2001, Mr. Jackson's income increased an average of \$1,500 per year.

### Exercises

**SURF** For Exercises 1–3, use the graph that shows the average daily wave height as measured by an ocean buoy over a nine-day period.



- Find the rate of change in the average daily wave height between day 1 and day 3.
- Find the rate of change in the average daily wave height between day 3 and day 7.
- Find the rate of change in the average daily wave height between day 7 and day 9.

**3-5****Word Problem Practice*****The Pythagorean Theorem***

<p><b>1. ART</b> What is the length of a diagonal of a rectangular picture whose sides are 12 inches by 17 inches? Round to the nearest tenth of an inch.</p>	<p><b>2. GARDENING</b> Ross has a rectangular garden in his back yard. He measures one side of the garden as 22 feet and the diagonal as 33 feet. What is the length of the other side of his garden? Round to the nearest tenth of a foot.</p>
<p><b>3. TRAVEL</b> Troy drove 8 miles due east and then 5 miles due north. How far is Troy from his starting point? Round the answer to the nearest tenth of a mile.</p>	<p><b>4. GEOMETRY</b> What is the perimeter of a right triangle if the hypotenuse is 15 centimeters and one of the legs is 9 centimeters?</p>
<p><b>5. ART</b> Anna is building a rectangular picture frame. If the sides of the frame are 20 inches by 30 inches, what should the diagonal measure? Round to the nearest tenth of an inch.</p>	<p><b>6. CONSTRUCTION</b> A 20-foot ladder leaning against a wall is used to reach a window that is 17 feet above the ground. How far from the wall is the bottom of the ladder? Round to the nearest tenth of a foot.</p>
<p><b>7. CONSTRUCTION</b> A door frame is 80 inches tall and 36 inches wide. What is the length of a diagonal of the door frame? Round to the nearest tenth of an inch.</p>	<p><b>8. TRAVEL</b> Tina measures the distances between three cities on a map. The distances between the three cities are 45 miles, 56 miles, and 72 miles. Do the positions of the three cities form a right triangle?</p>