Name

7-2 Lesson Master

Questions on SPUR Objectives
See Student Edition pages 462–465 for objectives.

SKILLS Objective B

1. Let $f(x) = x^2 - 1$ with domain $\mathbb{R}$. Use the definition of derivative to find

   a. $f'(-1)$. _____ b. $f'(4)$. _____ c. $f'(0)$. _____

2. Explain why you could not find the derivatives in Question 1 if the domain of f were $\mathbb{Z}$.

   _____

   _____

USES Objectives D and E

3. Recall that the formula for the area of a circle is $A = \pi r^2$. Suppose an artist is pouring paint onto a canvas, and the paint is spreading in a near-perfect circle.

   a. Find the instantaneous rate of change of the area of the circle when $r = 1$. _____

   b. Find the instantaneous rate of change of the area of the circle when $r = 3$. _____

   c. Use your answers to Part a and b to determine how much faster the artist should pour the paint onto the canvas when $r = 3$ than when $r = 1$ in order for the circle's radius to increase at a constant rate. _____

4. During batting practice, Mike hit a baseball right out of the park! Suppose the height h in feet of the ball after t seconds is modeled by the equation $h = -16t^2 + 85t + 5$.

   a. What is the instantaneous velocity of the ball when $t = 1$? _____

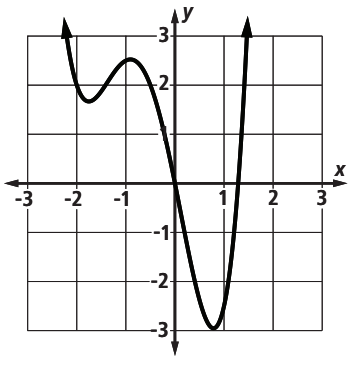
   b. What is the instantaneous velocity of the ball when $t = 3$? _____

   c. At which moment, when $t = 1$ or $t = 3$, is the height of the ball changing faster? _____

   d. At which moment, when $t = 1$ or $t = 3$, is the ball falling? _____

REPRESENTATIONS Objective H

5. Refer to the graph of the function g at the right.



   a. Sketch the line tangent to the graph of g at $x = -2$.

   b. Explain how the line you drew in Part a is related to the derivative of g at $x = -2$.

   _____

   _____

   c. Use Parts a and b to estimate $g'(-2)$. _____