

Name _____

7-6 Lesson Master

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

SKILLS Objective B

In 1–3, give a formula for the first derivative of the function with the given equation.

1. $f(x) = 4^x$ _____ 2. $g(y) = 7 \cdot 2^y$ _____ 3. $h(t) = 14a^t$ _____
4. Let $b(x) = 2e^x$. Give a formula for
- a. the first derivative of b . _____ b. the second derivative of b . _____

PROPERTIES Objective C

5. Use the fact that the derivative of the function m with $m(x) = e^{8x+2}$ is given by the equation $m'(x) = 8e^{8x+2}$ to prove that m is increasing over the set of all real numbers.
- _____
- _____
6. Use the fact that the derivative of the function r with equation $r(x) = 2^x + x^2$ is given by the equation $r'(x) = (\ln 2) \cdot 2^x + 2x$.
- a. What is the slope of the line tangent to the graph of r when $x = 3$? _____
- b. Give an equation for the line in Part a. _____
- c. Is the function r increasing or decreasing over the interval $[0, 4]$? Explain your answer.
- _____

USES Objective I

7. The cost to send of a letter (up to one ounce) from 1932 to 1991 can be estimated using the equation $c(y) = 0.437 \cdot (1.045)^y$, where y is the number of years after 1900 and $c(y)$ is the cost in cents.
- a. Find an equation for the first derivative of the function c . _____
- b. What is an appropriate unit for measuring $c'(y)$? _____
- c. Use a calculator to estimate $c'(50)$ and explain what the value means in this context.
- _____
- d. According to this model, was the cost to send a letter increasing faster in 1960 or 1990? Explain your answer.
- _____

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