

Name \_\_\_\_\_

# 14-7 Lesson Master

## Questions on SPUR Objectives

See Student Edition pages 862–865 for objectives.

### PROPERTIES Objective D

In 1–3, an expression of the form  $\int_a^b f(x)dx$  is given.

- Find an antiderivative  $g$  of the function  $f$ .
- Use your answer to Part a and the first part of the Fundamental Theorem of Calculus to evaluate the integral.

1.  $\int_{-5}^2 3dx$

a. \_\_\_\_\_

b. \_\_\_\_\_

2.  $\int_4^{10} -7x^2dx$

a. \_\_\_\_\_

b. \_\_\_\_\_

3.  $\int_{80}^{100} \left(\frac{1}{4}x - 1\right)dx$

a. \_\_\_\_\_

b. \_\_\_\_\_

4. If  $p(x) = x^9 + 3x^5 - x^4 + 4$ , find  $\int_{-1}^1 p'(x)dx$ . \_\_\_\_\_

5. If  $q(x) = 2^x + 3^x$ , find  $\int_2^4 q'(x)dx$ . \_\_\_\_\_

In 6–9, find an equation for the derivative of the given function.

6.  $j(x) = \int_a^x \cos(x)dx$  \_\_\_\_\_

7.  $k(x) = \int_0^x \log_2(x + 1)dx$  \_\_\_\_\_

8.  $\ell(x) = \int_3^x \frac{3}{x^2 + 9}dx$  \_\_\_\_\_

9.  $m(x) = \int_5^x \sqrt{2 + x + x^3}dx$  \_\_\_\_\_

10. For all positive integers  $w$ , if  $h(x) = x^w$ , one antiderivative of  $h$  is  $g(x) = \frac{x^{w+1}}{w+1}$ . Use this information to evaluate each integral.

a.  $\int_0^5 x^6dx$  \_\_\_\_\_

b.  $\int_1^9 2x^3dx$  \_\_\_\_\_

c.  $\int_0^{10} (2x^4 + 6x^3 + 3x)dx$  \_\_\_\_\_

11. a. If  $s(x) = 2 \sin x \cos x$ , then one of its antiderivatives is  $S(x) = \sin^2(x)$ .

Use this information to evaluate  $\int_0^{\frac{4\pi}{3}} (2 \sin x \cos x)dx$ . \_\_\_\_\_

- Check your answer to Part a by calculating several Reimann sums of the function  $s$  over the interval  $\left[0, \frac{4\pi}{3}\right]$ . Use 8, 16, and 64 subintervals and the right endpoint of each subinterval as the intermediate values. As  $n$  increases, do the Reimann sums seem to be approaching your answer to Part a?

\_\_\_\_\_

12.  $z(x) = \frac{x^3}{3}$  is one antiderivative of  $f(x) = x^2$ . Name another antiderivative of  $f$ .