

Graph each function. State the domain and range.

- $f(x) = 3^{x-3} + 2$  **1, 2. See margin.**
- $f(x) = 2\left(\frac{3}{4}\right)^{x+1} - 3$

Solve each equation or inequality. Round to the nearest ten-thousandth if necessary.

- $8^{c+1} = 16^{2c+3}$   **$c = -\frac{9}{5}$**
- $9^{x-2} > \left(\frac{1}{27}\right)^x$   **$\{x \mid x > \frac{4}{5}\}$**
- $2^{a+3} = 3^{2a-1}$   **$a \approx 2.1130$**
- $\log_2(x^2 - 7) = \log_2 6x$   **$x = 7$**
- $\log_5 x > 2$   **$\{x \mid x > 25\}$**
- $\log_3 x + \log_3(x - 3) = \log_3 4$   **$x = 4$**
- $6^{n-1} \leq 11^n$   **$\{n \mid n \leq -2.9560\}$**
- $4e^{2x} - 1 = 5$   **$x \approx 0.2027$**
- $\ln(x + 2)^2 > 2$   **$\{x \mid x < -4.7183 \text{ or } x > 0.7183, x \neq -2\}$**

**17. MULTIPLE CHOICE** What is the value of  $\log_4 \frac{1}{64}$ ? **A**

- A -3
- B  $-\frac{1}{3}$
- C  $\frac{1}{3}$
- D 3

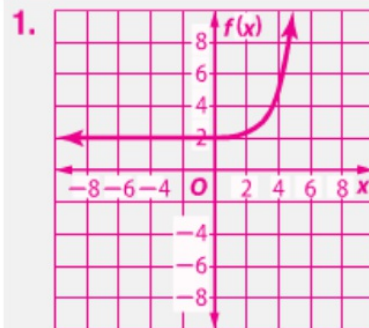
**18. SAVINGS** You put \$7500 in a savings account paying 3% interest compounded continuously.

- Assuming there are no deposits or withdrawals from the account, what is the balance after 5 years? **\$8713.76**
- How long will it take your savings to double?  **$\approx 23.1$  years**
- In how many years will you have \$10,000 in your account? **about 9.6 years**

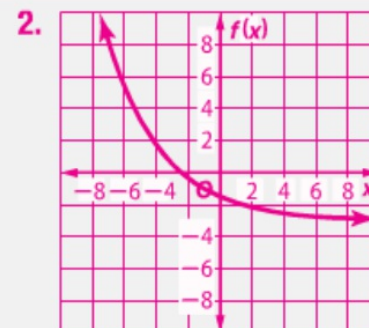
**19. MULTIPLE CHOICE** What is the solution of  $\log_2 x = \log_2 8$ ? **G**



### Additional Answers (Practice Test)



D = {all real numbers}  
R = {f(x) | f(x) > 2}



D = {all real numbers}  
R = {f(x) | f(x) > -3}

11.  $\ln(x+2)^2 > 2$   $\{x \mid x < -4.7103 \text{ or } x > 0.7103, x \neq -2\}$

Use  $\log_5 11 \approx 1.4899$  and  $\log_5 2 \approx 0.4307$  to approximate the value of each expression.

12.  $\log_5 44$  **2.3513**

13.  $\log_5 \frac{11}{2}$  **1.0592**

14. **POPULATION** The population of a city 10 years ago was 150,000. Since then, the population has increased at a steady rate each year. The population is currently 185,000. **a.  $y = 185,000(1.0212)^x$**

a. Write an exponential function that could be used to model the population after  $x$  years if the population changes at the same rate. **about**

b. What will the population be in 25 years? **312,566**

15. Write  $\log_9 27 = \frac{3}{2}$  in exponential form.  **$9^{\frac{3}{2}} = 27$**

16. **AGRICULTURE** An equation that models the decline in the number of U.S. farms is  $y = 3,962,520(0.98)^x$ , where  $x$  is the number of years since 1960 and  $y$  is the number of farms.

a. How can you tell that the number is declining?  **$\{b \mid b < 1\}$**

b. By what annual rate is the number declining? **2%**

c. Predict when the number of farms will be less than 1 million. **in about 2028**

19. **MULTIPLE CHOICE** What is the solution of  $\log_4 16 - \log_4 x = \log_4 8$ ? **G**

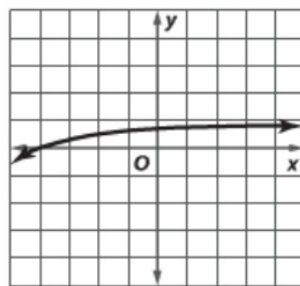
F  $\frac{1}{2}$

G 2

H 4

J 8

20. **MULTIPLE CHOICE** Which function is graphed below? **C**



A  $y = \log_{10}(x - 5)$

B  $y = 5 \log_{10} x$

C  $y = \log_{10}(x + 5)$

D  $y = -5 \log_{10} x$

**$\ln \frac{(6^2)(4^3)}{\left(\frac{1}{3}\right)^5}$  or  $\ln 559,872$**

21. Write  $2 \ln 6 + 3 \ln 4 - 5 \ln \left(\frac{1}{3}\right)$  as a single logarithm.