

# Chapter Standardized Test

**TEST-TAKING STRATEGY** Be aware of how much time you have left, but keep focused on your work.

1. **MULTIPLE CHOICE** Simplify  $7^4 \cdot 7^7$ . Write the answer as a power.

- (A)  $7^3$       (B)  $7^{11}$       (C)  $7^{28}$   
(D)  $49^{11}$       (E)  $49^{28}$

2. **MULTIPLE CHOICE** Evaluate  $[(a + 1)^2]^2 \cdot a^3$  when  $a = 2$ .

- (A) 72      (B) 128      (C) 136  
(D) 200      (E) 648

3. **MULTIPLE CHOICE** Evaluate  $(5^{-3})^2$ .

- (A) -3125      (B)  $-\frac{1}{15,625}$   
(C)  $\frac{1}{3125}$       (D)  $\frac{1}{15,625}$   
(E) 15,625

4. **MULTIPLE CHOICE** Evaluate  $-8^0 \cdot 2^x \cdot 10^y$  when  $x = -2$  and  $y = -3$ .

- (A)  $-\frac{1}{4000}$       (B)  $-\frac{1}{500}$   
(C)  $\frac{1}{500}$       (D)  $\frac{1}{4000}$   
(E) 4000

5. **MULTIPLE CHOICE** Simplify  $\frac{4x^2y^2}{4xy} \cdot \frac{8xy^3}{4y}$ .

- (A)  $2x^2y^3$       (B)  $4x^2y$   
(C)  $2xy^2$       (D)  $2x^2y^4$   
(E)  $2xy^3$

6. **MULTIPLE CHOICE** Which expression simplifies to  $x^3$ ?

- (A)  $\frac{x^2}{x^5}$       (B)  $\frac{x^5}{x^{-2}}$   
(C)  $\frac{x^5}{x^2}$       (D)  $x^5 \cdot x^2$   
(E)  $x^5 - x^2$

7. **MULTIPLE CHOICE** Which of the following numbers is *not* written in scientific notation?

- (A)  $8.62 \times 10^4$       (B)  $2.12 \times 10^{-12}$   
(C)  $21.2 \times 10^{-5}$       (D)  $9.9132 \times 10^{-1}$   
(E)  $2.0001 \times 10^{-3}$

8. **MULTIPLE CHOICE** Rewrite  $3.6 \times 10^{-6}$  in decimal form.

- (A) 0.000036      (B) 3,600,000  
(C) 0.00000036      (D) 36,000,000  
(E) 0.0000036

9. **MULTIPLE CHOICE** Evaluate the product  $(6.2 \times 10^4) \cdot (2.4 \times 10^5)$ . Write the result in scientific notation.

- (A)  $1.488 \times 10^8$       (B)  $1.488 \times 10^{10}$   
(C)  $14.88 \times 10^1$       (D)  $14.88 \times 10^{10}$   
(E)  $14.88 \times 10^{20}$

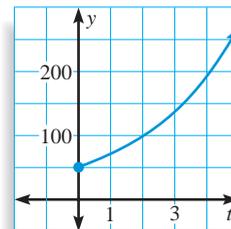
10. **MULTIPLE CHOICE** Evaluate  $\frac{(2.3622 \times 10^4)}{(3.81 \times 10^{-3})}$ .

Write the result in scientific notation.

- (A)  $6.2 \times 10^6$       (B)  $6.2 \times 10^8$   
(C)  $0.62 \times 10^6$       (D)  $6.2 \times 10^1$   
(E)  $6.2 \times 10^{-12}$

11. **MULTIPLE CHOICE** Which model best represents the growth curve shown below?

- (A)  $y = 50(1.4)^t$   
(B)  $y = 100(1.4)^t$   
(C)  $y = 50(1.12)^t$   
(D)  $y = 50(1.4)^{-t}$   
(E)  $y = 200(1.08)^t$



12. **MULTIPLE CHOICE** You deposit \$450 into a savings account that pays 6% interest compounded yearly. How much money is in the account after 6 years? Assume you make no more deposits or withdrawals.

- (A) \$477.00      (B) \$602.20  
(C) \$638.33      (D) \$676.63  
(E) \$693.33

13. **MULTIPLE CHOICE** In 1994 you bought a rare stamp for \$500 that you expect to increase in value 12% each year for the next 15 years. Write an exponential growth model and estimate the value of the stamp in 2002.
- (A) \$881.17      (B) \$986.91      (C) \$1557.92      (D) \$1237.98      (E) \$2000

**QUANTITATIVE COMPARISON** In Exercises 14–16, evaluate each function. Then choose the statement below that is true about the given values of  $y$ .

- A. The value of  $y$  in column A is greater.  
 B. The value of  $y$  in column B is greater.  
 C. The two values of  $y$  are equal.  
 D. The relationship cannot be determined from the given information.

	Column A	Column B
14. When $x = 3$ ,	$y = 3x$	$y = 3^x$
15. When $x = -2$ ,	$y = 3^x$	$y = \left(\frac{1}{3}\right)^x$
16. When $x = 1$ ,	$y = 3^{-x}$	$y = \left(\frac{1}{3}\right)^x$

17. **MULTIPLE CHOICE** The concentration of an allergy medication in a person's bloodstream in nanograms per milliliter (ng/mL) can be modeled by the equation  $y = 263(0.92)^t$ , where  $t$  represents the number of hours since the medication was taken. What is the concentration of the medication remaining in the person's bloodstream after 4 hours?
- (A) 263 ng/mL      (B) 222 ng/mL      (C) 205 ng/mL      (D) 188 ng/mL      (E) 170 ng/mL
18. **MULTIPLE CHOICE** A business had a profit of \$142,000 in 1994. Then its profit decreased by 8% each year for the next 6 years. Which exponential decay model would you use to find how much the business earned in the year 2000? Let  $E$  represent the earnings and let  $t$  represent the year.
- (A)  $E = 142,000(0.08)^t$       (B)  $E = 142,000(0.96)^t$       (C)  $E = 142,000(0.92)^t$   
 (D)  $t = 142,000(0.08)^E$       (E)  $E = 0.92(142,000)^t$
19. **MULTIPLE CHOICE** Which models below are exponential decay models?
- I  $y = 1.25^t$       II  $y = 0.97^t$       III  $y = \left(\frac{4}{3}\right)^t$       IV  $y = \left(\frac{2}{3}\right)^t$
- (A) I and II      (B) III and IV      (C) II and III      (D) I and III      (E) II and IV
20. **MULTI-STEP PROBLEM** The population in one midwestern town was tracked over several years. Based on the data for the town, population experts determined that the population, in thousands of people, could be represented by the expression  $2(1.175)^t$ , where  $t$  is the number of years from now.
- a. What is the population this year?  
 b. What is the estimated population 5 years from now?  
 c. What was the population 2 years ago?  
 d. *Writing* What advice would you give to the city planners who are trying to decide whether or not to build freeways? Include in your advice a population prediction for 10 years and 20 years from now.