

Chapter 11 Test, Form 1A

Write the letter for the correct answer in the blank at the right of each problem.

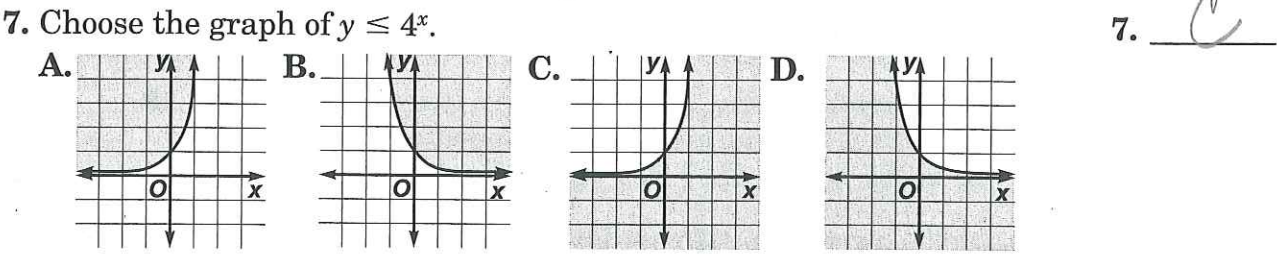
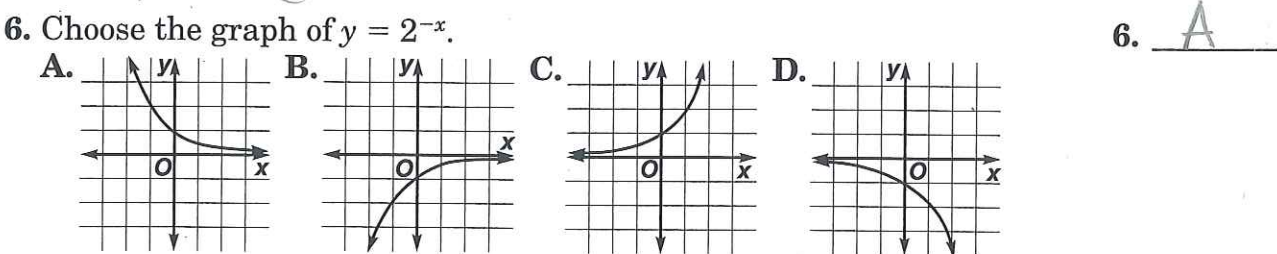
1. Evaluate $(9^{\frac{1}{2}} + 216^{\frac{1}{3}})^{-\frac{1}{2}}$. $(3+6)^{-1/2} = \frac{1}{3}$ 1. B
 A. $-\frac{1}{3}$ B. $\frac{1}{3}$ C. -3 D. 3

2. Simplify $(\frac{32x^4y^4}{4x^{-2}y})^{\frac{2}{3}}$. $(8x^6y^3)^{2/3} = 4x^4y^2$ 2. C
 A. $2x^{\frac{4}{3}}y$ B. $4x^{\frac{4}{3}}y^2$ C. $4x^4y^2$ D. $2x^4y^2$

3. Express $\sqrt[3]{27x^4y^6}$ using rational exponents. $27^{1/3}x^{4/3}y^2$ 3. A
 A. $3x^{\frac{4}{3}}y^2$ B. $9x^{\frac{4}{3}}y^2$ C. $9x^{\frac{3}{4}}y$ D. $9x^{\frac{3}{4}}y^2$

4. Express $(2x^2)^{\frac{1}{3}}(2x)^{\frac{1}{2}}$ using radicals. $(2x^2)^{\frac{2}{6}}(2x)^{\frac{3}{6}} = \sqrt[6]{(2x^2)^2(2x)^3}$ 4. C
 A. $\sqrt[6]{32x^5}$ B. $\sqrt[6]{4x^7}$ C. $x\sqrt[6]{32x}$ D. $x\sqrt[6]{4x} \sqrt[6]{4x^4 8x^3}$

5. Evaluate $9^{\frac{\pi}{2}}$ to the nearest thousandth. $\sqrt[6]{32x^7}$ 5. B
 A. 14.137 B. 31.544 C. 497.521 D. 799.438



8. In 2000, the bird population in a certain area is 10,000. The number of birds increases exponentially at a rate of 9% per year. Predict the population in 2005. 8. B
 A. 15,137 B. 15,683 C. 15,489 D. 15,771

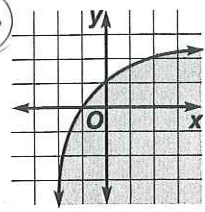
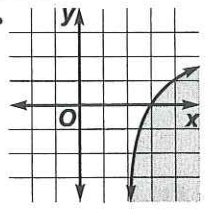
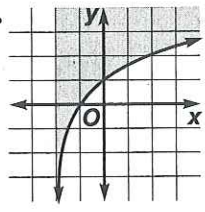
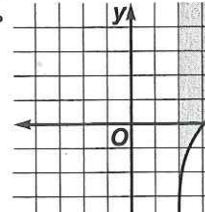
9. A scientist has 86 grams of a radioactive substance that decays at an exponential rate. Assuming $k = -0.4$, how many grams of radioactive substance remain after 10 days? 9. D
 A. 21.5 g B. 15.8 g C. 3.7 g D. 1.6 g

10. Write $3^{-2} = \frac{1}{9}$ in logarithmic form. 10. B
 A. $\log_3(-2) = \frac{1}{9}$ B. $\log_3 \frac{1}{9} = -2$ C. $\log_{-2} \frac{1}{9} = 3$ D. $\log_{-2} 3 = \frac{1}{9}$

Chapter 11 Test, Form 1A (continued)

11. Evaluate $\log_9 \frac{1}{27}$. $9^x = \frac{1}{27}$
 A. $\frac{2}{3}$ B. $\frac{3}{2}$ C. $-\frac{2}{3}$ D. $-\frac{3}{2}$ 11. D

12. Solve $\log_4 x + \log_4 (x - 2) = \log_4 15$. $x(x-2) = 15$
 A. -3 only B. 5 only C. -3 or 5 D. -5 or 3 12. B

13. Choose the graph of $y \leq \log_2 (x + 2)$. $x^2 - 2x - 15 = 0$ $(x-5)(x+3)$
 A.  B.  C.  D.  13. A

$2^y \leq x + 2$
 $2^y - 2 \leq x$

X	Y
-1.75	-2
-1.5	-1
-1	0
0	1
2	2

14. Find the value of $\log_6 27.5$ using the change of base formula. $\log_{27.5}$
 A. 0.661 B. 1.439 C. 1.850 D. 2.232 14. C

15. Solve $5^x = 3^{x+2}$ using common logarithms. $x \log 5 = (x+2) \log 3$
 A. 2.732 B. 3.109 C. 4.117 D. 4.301 15. D

16. The pH of a water supply is 7.3. What is the concentration of hydrogen ions in the tested water? $x(\log 5 - \log 3) = 2 \log 3$
 A. 5.012×10^{-8} B. -0.863 C. 5.012 D. 1.995×10^7 16. _____

17. Convert $\log_5 47$ to a natural logarithm and evaluate. $\frac{\ln 47}{\ln 5}$
 A. 0.770 B. 2.241 C. 2.392 D. 2.516 17. C

18. Solve $e^{0.2x} < 21.2$ by using natural logarithms. $0.2x \ln e < \ln 21.2$
 A. $x < -1.898$ B. $x < 4.663$ C. $x < 8.234$ D. $x < 15.270$ 18. D

19. **Banking** Find the amount of time required for an investment to double at a rate of 12.3% if the interest is compounded continuously. $\frac{\ln 2}{0.123}$
 A. 5.635 years B. 6.241 years C. 7.770 years D. 8.325 years 19. A

20. **Biology** The table below shows the population of a given bacteria colony. 20. _____

Time (days)	0	3	6	9	12
Population (thousands)	95	120	155	190	250

Let x be the number of days and let y be the population in thousands. Linearize the data and find a regression equation for the linearized data.
 A. $\ln y = 0.0948x + 4.3321$ B. $\ln y = 0.0798x + 4.5517$
 C. $\ln y = 0.0722x + 4.7735$ D. $\ln y = 0.0785x + 4.8203$

- Bonus** Express $\sqrt[5]{\sqrt{x^6}}$ in exponential form. Assume $x > 0$. **Bonus:** _____
 A. $x^{\frac{3}{5}}$ B. $x^{\frac{5}{3}}$ C. $x^{\frac{1}{60}}$ D. $x^{\frac{4}{5}}$