

9

Chapter 9 Mid-Chapter Test

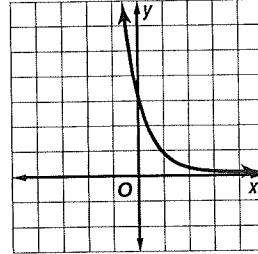
(Lessons 9-1 through 9-3)

SCORE _____

Part I Write the letter for the correct answer in the blank at the right of each question.

1. Find the domain and range of the function shown.

- A. $D = \{x \mid x > 0\}$, $R = \{y \mid y \text{ is any real number}\}$
- B. $D = \{x \mid x \text{ is any real number}\}$, $R = \{y \mid y < 0\}$
- C. $D = \{x \mid x \text{ is any real number}\}$, $R = \{y \mid y > 0\}$
- D. $D = \{x \mid x > 0\}$, $R = \{y \mid y > 0\}$



1. _____

2. Simplify the expression $y^{5\sqrt{7}} \div y^{\sqrt{7}}$.

- F. y^{35}
- G. y^5
- H. $y^{6\sqrt{7}}$
- J. $y^{4\sqrt{7}}$

2. _____

3. Write the equation $4^{-3} = \frac{1}{64}$ in logarithmic form.

- A. $\log_{-3} 4 = \frac{1}{64}$
- B. $\log_4 \frac{1}{64} = -3$
- C. $\log_{\frac{1}{64}} (-3) = 4$
- D. $\log_4 (-3) = \frac{1}{64}$

3. _____

4. Evaluate $\log_4 32$.

- F. $\frac{5}{2}$
- G. 8
- H. 3
- J. $\frac{2}{5}$

4. _____

5. Solve $\log_3 (7x - 3) \geq \log_3 (5x)$.

- A. $x \geq \frac{3}{2}$
- B. $x > \frac{3}{7}$
- C. $x \geq 0$
- D. $x \geq \frac{2}{3}$

5. _____

6. Use $\log_3 5 = a$ and $\log_3 7 = b$ to write $\log_3 \frac{21}{5}$ in terms of a and b .

- F. $\frac{3b}{a}$
- G. $a - b + 1$
- H. $b - a$
- J. $1 + b - a$

6. _____

Part II

7. Write an exponential function whose graph passes through the points $(0, -3)$ and $(4, -48)$.

7. _____

For Questions 8-11, solve each equation.

8. $\log_{\frac{1}{5}} m = -2$

8. _____

9. $\log_7 (x + 3) - \log_7 (x - 3) = 1$

9. _____

10. $\log_3 (y - 8) + \log_3 (y + 4) = \log_3 13$

10. _____

11. Use $\log_2 3 = x$ and $\log_2 7 = y$ to write the expression $\log_2 84$ in terms of x and y .

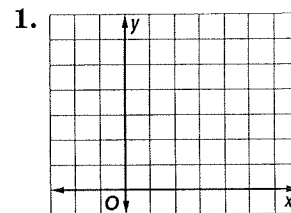
11. _____

9 Chapter 9 Quiz 1

(Lessons 9-1 and 9-2)

SCORE _____

1. Sketch the graph of $y = 3\left(\frac{1}{2}\right)^x$. Then state the function's domain and range.



2. Write an exponential function whose graph passes through the points (0, -5) and (-2, -20). Then determine whether the function represents exponential *growth* or *decay*.

3. Simplify $3^{\sqrt{5}} \cdot 3^{2\sqrt{5}}$.

4. Solve $\left(\frac{1}{3}\right)^m = 27^m + 2$.

5. Solve $25^{4t} + 1 \geq 125^{2t}$.

6. Write the equation $81^{\frac{1}{2}} = 9$ in logarithmic form.

7. Write the equation $\log_{216} 36 = \frac{2}{3}$ in exponential form.

8. Evaluate $\log_{16} 64$.

9. Solve $\log_{16} n = -\frac{1}{2}$.

10. Solve $\log_5 (4x - 1) \geq \log_5 (x + 2)$.

- _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

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Assessment

9 Chapter 9 Quiz 2

(Lesson 9-3)

SCORE _____

Use $\log_5 2 = x$ and $\log_5 3 = y$ to write each expression in terms of x and y .

1. $\log_5 \frac{10}{3}$

2. $\log_5 24$

1. _____
2. _____

Solve each equation.

3. $\log_7 36 - \log_7 (2x) = \log_7 4$

4. $\log_3 x = \frac{1}{2} \log_3 25 - 5 \log_3 2$

5. $\log_2 (x + 1) + \log_2 (x - 5) = 4$

3. _____
4. _____
5. _____

9 Chapter 9 Quiz 3

(Lessons 9-4 and 9-5)

SCORE _____

Use a calculator to evaluate each expression to four decimal places.

1. $\log 1.5$

2. $\ln 4.1$

For Questions 3-7, solve each equation or inequality. Round to four decimal places.

3. $4^{2m} = 130$

4. $5^{x+4} = 2^{3x}$

5. $7^t - 5 < 21.5$

6. $\ln(x+5) = 3$

7. $4 + 2e^{5x} \geq 28$

8. Express $\log_3 25$ in terms of common logarithms. Then approximate its value to four decimal places.

9. Write an equivalent logarithmic equation for $e^3 = 2x$.

10. Evaluate $e^{\ln 0.3}$.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

9 Chapter 9 Quiz 4

(Lesson 9-6)

SCORE _____

1. A substance decays according to the equation $y = ae^{-0.0025t}$, where t is in minutes. Find the half-life of the substance. Round to the nearest tenth.

2. A-1 Electric has a piece of machinery valued at \$55,000. It depreciates at a rate of 12.5% per year. After how many years will the value have depreciated to \$38,000? Round to the nearest tenth.

3. **MULTIPLE CHOICE** In 1925, the population of a city was 90,000. Since then, the population has increased by 2.1% per year. If it continues to grow at this rate, what will the population be in 2020?
 A. 4,073,333 B. 136,382 C. 648,169 D. 6.6×10^{12}

4. The Morgans bought a house worth \$125,000. Assuming that the house will appreciate 8% per year, what will the house be worth in eight years? Round to the nearest dollar.

5. A type of bacteria doubles in number every 25 minutes. Find the constant k for this type of bacteria, then write the equation for modeling this exponential growth.

1. _____

2. _____

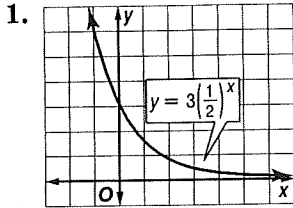
3. _____

4. _____

5. _____

Chapter 9 Assessment Answer Key

Quiz 1 (Lessons 9-1 and 9-2)
Page 51



$D = \{x \mid x \text{ is any real number.}\}$, $R = \{y \mid y > 0\}$

2. $y = 5\left(\frac{1}{2}\right)^x$; decay

3. $3^3\sqrt{5}$

4. $-\frac{3}{2}$

5. $t \geq -1$

6. $\log_{81} 9 = \frac{1}{2}$

7. $216^{\frac{2}{3}} = 36$

8. $\frac{3}{2}$

9. $\frac{1}{4}$

10. $x \geq 1$

Quiz 2 (Lesson 9-3)
Page 51

1. $x + 1 - y$

2. $3x + y$

3. $\frac{9}{2}$

4. $\frac{5}{32}$

5. 7

Quiz 3 (Lessons 9-4 and 9-5)
Page 52

1. 0.1761

2. 1.4110

3. 1.7556

4. 13.6972

5. $\{t \mid t < 6.5767\}$

6. 15.0855

7. $\{x \mid x \geq 0.4970\}$

8. $\frac{\log 25}{\log 3} \approx 2.9299$

9. $3 = \ln 2x$

10. 0.3

Quiz 4 (Lesson 9-6)
Page 52

1. 277.3 min

2. 2.8 yr

3. C

4. $\$231,366$

5. $k \approx 0.0277$;
 $y = ae^{0.0277t}$

Mid-Chapter Test
Page 53

1. C

2. J

3. B

4. F

5. A

6. J

7. $y = -3(2^x)$

8. 25

9. 4

10. 9

11. $x + y + 2$