

Unit 6 Test

Exponent Rules, Radicals & Exponential Growth/Decay

Name: _____ Date: _____ Score: ____ / 10

INSTRUCTIONS

For multiple-choice questions, circle the letter of the correct answer. For short-answer and problem-solving questions, show your complete work in the space provided. No calculator unless your teacher says otherwise.

1 Simplify: $(x^3)^4$

Multiple Choice

☐ **A** x^7

☐ **B** x^{12}

☐ **C** x^{64}

☐ **D** x^{81}

2 Simplify: $x^6 \div x^2$

Multiple Choice

☐ **A** x^3

☐ **B** x^8

☐ **C** x^4

☐ **D** x^{12}

3 Short Answer — Simplify: $(2x^2y^3)^3$

Short Answer

4 Simplify: 5^0

Multiple Choice

☐ **A** 0

☐ **B** 5

☐ **C** 1

☐ **D** Undefined

5 Evaluate: $64^{1/3}$

Multiple Choice

☐ **A** 4

☐ **B** 8

☐ **C** 21.33

☐ **D** $1/4$

6 Short Answer — Simplify the radical: $\sqrt{50}$

Short Answer

7 A population starts at 500 and grows 4% per year. Which function models the population after t years?

Multiple Choice

☐ **A** $y = 500(1.04)^t$

☐ **B** $y = 500(0.04)^t$

☐ **C** $y = 500(1.4)^t$

☐ **D** $y = 500(4)^t$

8

A car worth \$20,000 depreciates 15% per year. Which function models its value after t years?

Multiple Choice

A

$y = 20000(0.15)^t$

B

$y = 20000(1.15)^t$

C

$y = 20000(0.85)^t$

D

$y = 20000 - 0.15t$

9

Problem Solving — A bacteria culture starts with 200 cells and doubles every 3 hours. Write an exponential function for the population after t hours, and find the population after 9 hours.

Problem Solving

10

Problem Solving — Simplify $(3x^{-2}y^4)/(x^3y^{-1})$, writing your answer with only positive exponents. Show all steps.

Problem Solving