

Unit 6 Test — Answer Key

Exponent Rules, Radicals & Exponential Growth/Decay

FOR TEACHER / SELF-CHECK USE

This test was written to cover Unit 6's topics (exponent rules, scientific notation, rational exponents, radicals, and exponential growth/decay models). Every solution below has been independently verified.

1	Power of a power: multiply exponents. $3 \times 4 = 12$. Answer: B — x^{12}
2	Quotient of powers: subtract exponents. $6 - 2 = 4$. Answer: C — x^4
3	Cube each factor: $2^3 = 8$, $(x^2)^3 = x^6$, $(y^3)^3 = y^9$. Answer: $8x^6y^9$
4	Any nonzero number raised to the 0 power equals 1. Answer: C — 1
5	$64^{1/3}$ means the cube root of 64. $4^3 = 64$, so the cube root is 4. Answer: A — 4
6	$50 = 25 \times 2$. $\sqrt{50} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$. Answer: $5\sqrt{2}$
7	Growth of 4% means multiplying by $(1 + 0.04) = 1.04$ each year. Answer: A — $y = 500(1.04)^t$
8	Depreciation of 15% means multiplying by $(1 - 0.15) = 0.85$ each year. Answer: C — $y = 20000(0.85)^t$
9	Doubling every 3 hours: $N(t) = 200 \cdot 2^{t/3}$. At $t = 9$: $N(9) = 200 \cdot 2^{9/3} = 200 \cdot 2^3 = 200 \cdot 8$. Answer: $N(t) = 200 \cdot 2^{t/3}$; $N(9) = 1,600$ cells
10	Divide like bases by subtracting exponents: for x , $-2 - 3 = -5$, so $x^{-2} \div x^3 = x^{-5}$. For y , $4 - (-1) = 5$, so $y^4 \div y^{-1} = y^5$. Result: $3x^{-5}y^5$. Rewrite with positive exponents: $3y^5/x^5$. Answer: $3y^5/x^5$