

Algebra 2 - Radicals and Rational Exponents - Test Answer Key

Common Core N-RN.A.1, N-RN.A.2 · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on radicals and rational exponents (N-RN.A.1). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

Algebra 2 · Common Core State Standards: **N-RN.A.1, N-RN.A.2**

Question 1 - Convert forms [2 pts]

a. $x^{2/5}$

b. $\sqrt[3]{7}$

(a) $x^{2/5}$; **(b)** $\sqrt[3]{7}$

Scoring: 1 point for each conversion.

Question 2 - Evaluate [3 pts]

a. $\sqrt[3]{64} = 4$

b. $\sqrt[5]{32} = 2$, $2^3 = 8$

c. $4^{-3/2} = \frac{1}{(\sqrt{4})^3} = \frac{1}{8}$

(a) 4; **(b)** 8; **(c)** $\frac{1}{8}$

Scoring: 1 point for each part.

Question 3 - Variable expressions [2 pts]

a. $\frac{3}{5} + \frac{7}{5} = 2$, so x^2

b. $27^{1/3} = 3$, $(a^6)^{1/3} = a^2$, so $3a^2$

(a) x^2 ; **(b)** $3a^2$

Scoring: 1 point for each part.

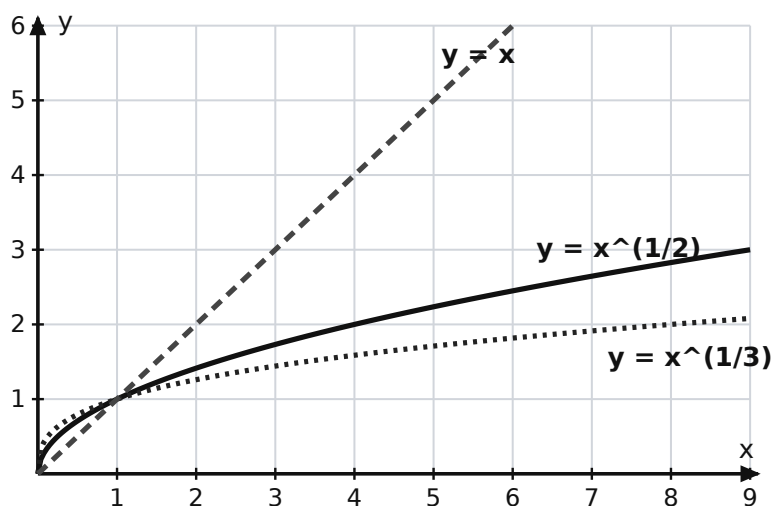
Question 4 - Quotient [2 pts]

$x^{7/3-1/3} = x^2$ and $y^{-1/2-3/2} = y^{-2}$.

$\frac{x^2}{y^2}$

Scoring: 1 point for each variable.

Question 5 - Solve [3 pts]



Root curves for reference; the solutions come from the algebra above.

$(\sqrt[3]{x})^2 = 25$, so $\sqrt[3]{x} = 5$ or -5 .

Cube: $x = 125$ or $x = -125$.

Check: $125^{2/3} = 25$ and $(-125)^{2/3} = 25$.

$x = 125$ or $x = -125$

Scoring: 1 point for isolating the cube root with both signs, 1 point for both cubes, 1 point for the checks.

Question 6 - Animal metabolism [2 pts]

Mass m (kg)	$m^{(3/4)}$	$R = 70 m^{(3/4)}$
1	1	70
16	8	560
81	27	1890

Completed table.

$$1^{3/4} = 1; 16^{3/4} = 8; 81^{3/4} = (\sqrt[4]{81})^3 = 27.$$

Multiply by 70: 70, 560, 1,890.

70; 560; 1,890 kcal per day

Scoring: 1 point for the $m^{(3/4)}$ column, 1 point for the R column.

Question 7 - Find the error [2 pts]

In $8^{2/3}$ the denominator 3 is the root index and the numerator 2 is the power. Liam swapped them.

$$\text{Correct: } (\sqrt[3]{8})^2 = 2^2 = 4.$$

The index is 3, not 2; the value is 4

Scoring: 1 point for identifying the swap, 1 point for the value.

Question 8 - Kepler's law [2 pts]

$$a^{3/2} = 125. \text{ Raise both sides to } 2/3: a = 125^{2/3} = 5^2 = 25.$$

$$\text{Check: } 25^{3/2} = 5^3 = 125.$$

25 astronomical units

Scoring: 1 point for the reciprocal power, 1 point for the value.

Question 9 - Growth factor [2 pts]

After 6 hours: $(3^{1/2})^6 = 3^3 = 27$.

After 5 hours: $(3^{1/2})^5 = 3^{5/2} = 9\sqrt{3}$.

27 and $9\sqrt{3}$

Scoring: 1 point for each multiplier.

Total
20 points