

Algebra 2 · Radicals and Rational Exponents · Test Answer Key

Common Core N-RN.A.1, N-RN.A.2, A-REI.A.2 · mathovore.fr

This key gives a complete solution and a scoring guide for every question. Award partial credit as described, and give full credit for any valid method that reaches the correct result, including equivalent radical forms.

Algebra 2 Common Core: N-RN.A.1 · N-RN.A.2 · A-REI.A.2

Question 1: Roots and powers (2 points)

a. $(-5)^3 = -125$; -5 .

b. $(\sqrt[4]{81})^3 = 3^3 = 27$.

Scoring: 1 point for each part.

Question 2: Radical and exponent forms (2 points)

a. $\sqrt[3]{x^5}$, which equals $(\sqrt[3]{x})^5$.

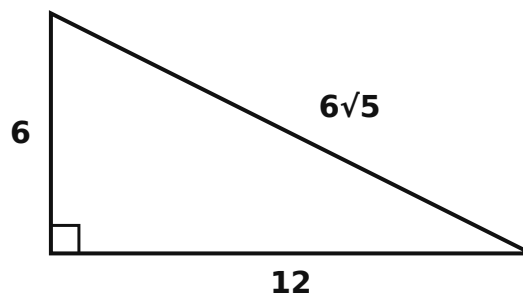
b. $y^{3/4}$.

Scoring: 1 point for each part. Accept $(\sqrt[3]{x})^5$ in part a.

Question 3: Simplify radicals (2 points)

a. $c = \sqrt{12^2 + 6^2} = \sqrt{180} = \sqrt{36 \cdot 5} = 6\sqrt{5}$.

b. $\sqrt[3]{8x^3 \cdot 5x} = 2x\sqrt[3]{5x}$.



Hypotenuse $c = 6\sqrt{5} \approx 13.42$.

Scoring: 1 point for each part: 0.5 for the correct setup and 0.5 for the simplified result.

Question 4: Combine radicals (2 points)

- a. $10\sqrt{3}-4\sqrt{3}+5\sqrt{3}=11\sqrt{3}$.
b. $\frac{12}{2\sqrt{2}}=\frac{6}{\sqrt{2}}=\frac{6\sqrt{2}}{2}=3\sqrt{2}$.

Scoring: 1 point for each part: 0.5 for simplifying each radical correctly and 0.5 for the final answer.

Question 5: Exponent properties (2 points)

- a. $\frac{2}{3}+\frac{3}{4}=\frac{8}{12}+\frac{9}{12}=\frac{17}{12}$: $x^{17/12}$.
b. $16^{3/4}\cdot a^3=8a^3$: $8a^3$.

Scoring: 1 point for each part.

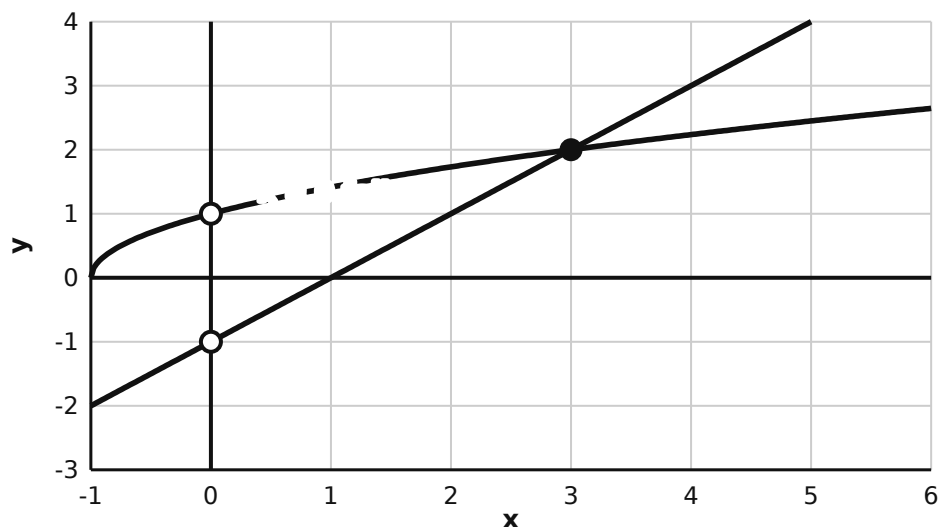
Question 6: Solve equations (3 points)

- a. $\sqrt{3x-2}=5$, $3x-2=25$, $x=9$. Check: $2(5)-4=6$. $x=9$
b. $x=64^{2/3}=16$. Check: $16^{3/2}=64$. $x=16$
c. $x+5=(-2)^3=-8$. $x=-13$

Scoring: 1 point for each part. Do not award the point in part a if the answer was not checked.

Question 7: Extraneous solution (3 points)

- a. The graphs cross once, at about $x=3$.
b. $x+1=x^2-2x+1$, so $x^2-3x=0$ and $x(x-3)=0$. The candidates are $x=0$ and $x=3$.
c. At $x=0$: $\sqrt{1}=1$ but $0-1=-1$, so it fails. At $x=3$: $\sqrt{4}=2=3-1$. The solution is $x=3$ and $x=0$ is extraneous.



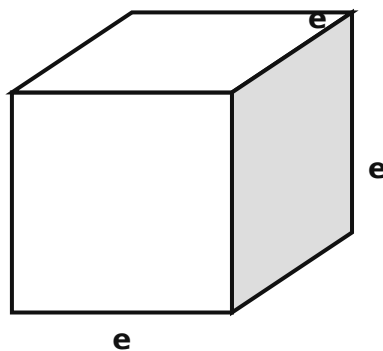
The graphs meet only at $(3,2)$.

Scoring: 1 point for each part. Part c needs both checks for the point.

Question 8: Cube-shaped box (4 points)

- a. $e = \sqrt[3]{192} = \sqrt[3]{64 \cdot 3} = 4\sqrt[3]{3}$ inches.
- b. $4(1.44225) \approx 5.77$ inches.
- c. $6e^2 = 6 \cdot 16\sqrt[3]{9} = 96\sqrt[3]{9} \text{ in}^2$, about 199.69 in^2 .
- d. **Yes:** $5.77 < 6$, so the edge is shorter than the shelf height.

$$e = 4 \text{ cbrt}(3) \text{ in, about } 5.77 \text{ in}$$



Edge $e = 4\sqrt[3]{3} \approx 5.77$ inches.

Scoring: 1 point for each part. Part d needs the comparison and the conclusion.

Total
20 points