

Solving With Square and Cube Roots

Grade 8 math · Test Answer Key · Standards: 8.EE.A.2

Award points using the scoring line below each solution. For squared equations, both signs are required for full credit, and for estimates a supporting square or cube must be shown.

Standards: 8.EE.A.2 · **Level:** Grade 8

Question 1 Evaluate the roots (3 points)

- a. $14^2 = 196$, so 14.
- b. $(-7)^3 = -343$, so -7 .
- c. $\frac{7}{9}$ squared is $\frac{49}{81}$.

(a) 14 (b) -7 (c) $\frac{7}{9}$

Scoring: 1 point per part.

Question 2 Solve for x (3 points)

- a. $12^2 = 144$, so $x = \pm 12$.
- b. $(-6)^3 = -216$, so $x = -6$.
- c. $0.7^2 = 0.49$, so $x = \pm 0.7$.

(a) ± 12 (b) -6 (c) ± 0.7

Scoring: 1 point per part; in (a) and (c) give 1 point only for both signs.

Question 3 Between integers (2 points)

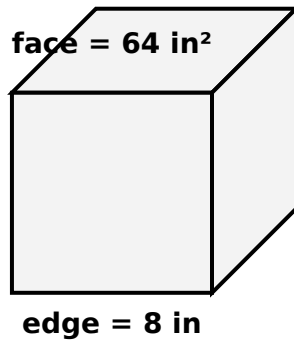
- a. $8^2 = 64$ and $9^2 = 81$, so $\sqrt{75}$ is between 8 and 9.
- b. $4^3 = 64$ and $5^3 = 125$, so $\sqrt[3]{75}$ is between 4 and 5.

(a) 8 and 9 (b) 4 and 5

Scoring: 1 point per part.

Question 4 Storage bin (3 points)

- a. Edge = $\sqrt[3]{512} = 8$ in, since $8^3 = 512$.
- b. One face: $8^2 = 64$ in².
- c. Six faces: $6 \cdot 64 = 384$ in².



Labeled bin.

(a) 8 in (b) 64 in² (c) 384 in²

Scoring: 1 point per part.

Question 5 Two-step equations (3 points)

- a. Add 20: $3x^2 = 147$. Divide by 3: $x^2 = 49$. So $x = \pm 7$.
- b. Subtract 6: $2x^3 = 128$. Divide by 2: $x^3 = 64$, so $x = 4$.

(a) ± 7 (b) 4

Scoring: (a) 1 point for $x^2 = 49$, 1 point for both solutions. (b) 1 point.

Question 6 Square deck (3 points)

- a. $11^2 = 121$ and $12^2 = 144$, so the side is between 11 and 12 ft.
- b. $11.6^2 = 134.56$ and $11.7^2 = 136.89$. Since 135 is closer to 134.56, the side is about 11.6 ft.
- c. No. 135 is not a perfect square, so $\sqrt{135}$ is irrational.

(a) 11 and 12 (b) 11.6 ft (c) No, $\sqrt{135}$ is irrational

Scoring: 1 point per part.

Question 7 Check Dan's claim (2 points)

$(-5)^2 = 25$, not -25 . The square of any real number is zero or positive, so $x^2 = -25$ has no real solution.

Dan is wrong: there is no real solution.

Scoring: 1 point for checking $(-5)^2 = 25$, 1 point for the explanation about squares.

Question 8 Compare (1 point)

$7.1^2 = 50.41$, which is more than 50, so $\sqrt{50} < 7.1$.

$\sqrt{50} < 7.1$

Scoring: 1 point for the correct comparison with $7.1^2 = 50.41$.