Math 10

Lesson 1–3 Answers

Lesson Questions

Question 1

$1^2 = 1$	$\sqrt{1} = 1$	$7^2 = 49$	$\sqrt{49} = 7$
$2^2 = 4$	$\sqrt{4} = 2$	$8^2 = 64$	$\sqrt{64} = 8$
$3^2 = 9$	$\sqrt{9} = 3$	$9^2 = 81$	$\sqrt{81} = 9$
$4^2 = 16$	$\sqrt{16} = 4$	$10^2 = 100$	$\sqrt{100} = 10$
$5^2 = 25$	$\sqrt{25} = 5$	$11^2 = 121$	$\sqrt{121} = 11$
$6^2 = 36$	$\sqrt{36} = 6$	$12^2 = 144$	$\sqrt{144} = 12$

Question 2

$$\begin{aligned} 1296 &= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \\ &= (2 \cdot 2 \cdot 3 \cdot 3) \cdot (2 \cdot 2 \cdot 3 \cdot 3) \\ &= 36 \cdot 36 \end{aligned}$$

$$\sqrt{1296} = 36$$

Question 3

Write the first 10 perfect cubes and their cube roots.

$1^3 = 1$	$\sqrt[3]{1} = 1$	$6^3 = 216$	$\sqrt[3]{216} = 6$
$2^3 = 8$	$\sqrt[3]{8} = 2$	$7^3 = 343$	$\sqrt[3]{343} = 7$
$3^3 = 27$	$\sqrt[3]{27} = 3$	$8^3 = 512$	$\sqrt[3]{512} = 8$
$4^3 = 64$	$\sqrt[3]{64} = 4$	$9^3 = 729$	$\sqrt[3]{729} = 9$
$5^3 = 125$	$\sqrt[3]{125} = 5$	$10^3 = 1000$	$\sqrt[3]{1000} = 10$

Question 4

$$\begin{aligned} 1728 &= 2 \cdot 2 \cdot 2 \cdot 6 \cdot 6 \cdot 6 \\ &= (2 \cdot 6) \cdot (2 \cdot 6) \cdot (2 \cdot 6) \\ &= 12 \cdot 12 \cdot 12 \end{aligned}$$

$$\sqrt[3]{1728} = 12$$

Question 5

What are the index and radicand for each of the following:

$\sqrt[3]{4}$	$\sqrt[4]{3}$	$\sqrt{5}$
index = 3	index = 4	index = 2
radicand = 4	radicand = 3	radicand = 5

Question 6

(a) 9 x 9 = 81

$\therefore \sqrt{81} = 9$

(b) 7 x 7 = 49 and 8 x 8 = 64 try 7.2

$7.2 \times 7.2 = 51.84$

$\therefore \sqrt{52} \cong 7.2$

(c) 4 x 4 x 4 = 64

$\therefore \sqrt[3]{64} = 4$

(d) 3^3 = 27 and 4^3 = 64 so try 3.7 and 3.8

$3.7 \times 3.7 \times 3.7 = 50.653$

$3.8 \times 3.8 \times 3.8 = 54.872$

$\therefore \sqrt[3]{52} \cong 3.7$

(e) 2^4 = 16 and 3^4 = 81 so try 2.7

$2.7 \times 2.7 \times 2.7 \times 2.7 = 53.1441$

$\therefore \sqrt[4]{52} \cong 2.7$

Assignment

1. a) $\sqrt{196} = 14$ d) $\sqrt{289} = 17$

2. a) $\sqrt[3]{343} = 7$ d) $\sqrt[3]{1331} = 11$

3. a) $225 = 3^2 \cdot 5^2 = (3 \cdot 5)^2$ Perfect square
   b) $729 = 3^6 = (3^3)^2 = (3^2)^3$ Perfect square and perfect cube
   c) $1944 = 2^3 \cdot 3^5$ Neither
   d) $1444 = 2^2 \cdot 19^2 = (2 \cdot 19)^2$ Perfect square
   e) $4096 = 2^{12} = (2^4)^3 = (2^6)^2$ Perfect square and perfect cube
   f) $13824 = 2^9 \cdot 3^3 = (2^3 \cdot 3)^3$ Perfect cube

4. a) $\sqrt{484} = 22\text{mm}$ b) $\sqrt{1764} = 42\text{yd.}$

5. a) $\sqrt[3]{5832} = 18\text{in.}$ b) $\sqrt[3]{15625} = 25\text{ft.}$

6. Find edge length first
   $x = \sqrt[3]{64} = 4$
   Surface area (SA) = $6 \cdot x^2 = 6 \cdot 4^2 = 96$ ft.^{2}

7. $SA = 6 \cdot x^2$

$x = \sqrt{\frac{SA}{6}} = \sqrt{\frac{6534}{6}} = 33$

$V = x^3 = 33^3 = 35937\,\text{ft.}^3$

8. $x = \sqrt[3]{2000} = 12.6$

No; 2000 is not a perfect cube.

9. The first 5 are: 1, 64, 729, 4096, 15625

10. $V = l \cdot w \cdot h$

$V = x^2 \cdot h$

$1440 = x^2 \cdot 10$

$144 = x^2$

$x = \sqrt{144}$

$x = 12$

11. $V = SA$

$x^3 = 6x^2$

$\frac{x^3}{x^2} = 6$

$x = 6$

$\text{edgelength} = 6\,\text{units}$

12. a) $\sqrt{121x^4y^2} = 11x^2y$ b) $\sqrt[3]{64x^6y^3} = 4x^2y$

13. Through trial and error: $1^3 + 12^3$, $9^3 + 10^3$

14. Find edge length first

$x = \sqrt[3]{2197} = 13\,\text{m}$

SA = $6 \cdot x^2 = 6 \cdot 13^2 = 1014\ \text{m}^3$

$1014 \div 40 = 25.35$

26 cans of paint are required