

Roots and Powers – Review

1. Identify the index of:

b) $\sqrt[3]{2^7}$	b) $\sqrt[4]{16}$	c) $\sqrt[4]{\frac{256}{625}}$
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2. What is the meaning of the index?
3. Identify the radicand of:

b) $\sqrt[3]{2^7}$	b) $\sqrt[4]{16}$	c) $\sqrt[4]{\frac{256}{625}}$
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4. Evaluate each of the following:

a) $\sqrt[4]{16}$	b) $\sqrt[3]{-64}$	c) $\sqrt[3]{8000}$	d) $\sqrt[4]{4096}$
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5. Use prime factorization to determine whether 4913 is a perfect square, a perfect cube or neither.
 6. Find the greatest common factor.

b) 420 and 864	b) 36, 48 and 72
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 7. Find the lowest common multiple.

b) 12 and 40	b) 16, 25 and 30
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 8. A cube has a volume of 74088 cm^3 . What is the surface area of the cube?
 9. A cube has a surface area of 5400 cm^2 . What is its volume?
 10. Marley is preparing treat bags for Halloween. She has 48 chips, 60 chocolate bars and 84 suckers. She wants all of her bags to be the same. How many bags can she make?
 11. Write each of the following as an entire:

a) $4\sqrt[3]{12}$	b) $5\sqrt[3]{5}$	c) $7\sqrt[3]{11}$	d) $3\sqrt[3]{10}$
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 12. Write each of the following in lowest terms (mixed radical)

a) $\sqrt[3]{243}$	b) $5\sqrt[3]{48}$	c) $\sqrt[3]{1080}$	d) $\sqrt[3]{2592}$
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 13. A cube has a volume of 1080 cm^3 . Write the edge length of the cube as a radical in simplest form.
 14. The surface area of a cube is 37800 cm^2 . Express the edge length of the cube in simplest form.

12. Write each of the following in lowest terms (mixed radical)

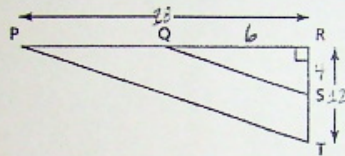
- a) $\sqrt[3]{243}$ b) $5\sqrt[3]{48}$ c) $\sqrt[3]{1080}$ d) $\sqrt[3]{2592}$

13. A cube has a volume of 1080cm^3 . Write the edge length of the cube as a radical in simplest form.

14. The surface area of a cube is 37800cm^2 . Express the edge length of the cube in simplest form.

15.

a) Use the diagram to explain why $\sqrt{468} = 6\sqrt{13}$



b) Use algebra to verify that $\sqrt{468} = 6\sqrt{13}$

16. Bill and Betty do chores at home. Bill mows the lawn every 8 days and Betty bathes the dog every 14 days. Suppose Bill and Betty do their chores today, how many days will pass before they both do their chores on the same day again?

$$1. \begin{array}{l} b) 3 \\ b) 4 \\ c) 4 \end{array} \left. \vphantom{\begin{array}{l} b) 3 \\ b) 4 \\ c) 4 \end{array}} \right\} \text{Index}$$

2. The index indicates how many #'s should be in each group.

$$\sqrt[3]{\underbrace{2 \times 2 \times 2} \times 5}$$

$$3. \begin{array}{l} b) 2^7 \\ b) 16 \\ c) 256 \\ \quad 625 \end{array} \quad \text{Radicand}$$

$$4. a) \sqrt[4]{16}$$

$$\sqrt[4]{\underbrace{2 \times 2 \times 2 \times 2}}$$

2

$$b) \sqrt[4]{64}$$

$$\sqrt[4]{\underbrace{2 \times 2 \times 2} \times \underbrace{2 \times 2 \times 2}}$$

$$\frac{2 \times 2}{4}$$

$$4c) \sqrt[3]{8000}$$

$$\sqrt[3]{\cancel{2 \times 2 \times 2} \times \cancel{2 \times 2 \times 2} \times (5 \times 5 \times 5)}$$

$$2 \times 2 \times 5$$

$$20$$

$$4d) \sqrt[4]{4096}$$

$$\sqrt[4]{\cancel{2 \times 2 \times 2 \times 2} \times \cancel{2 \times 2 \times 2 \times 2} \times \cancel{2 \times 2 \times 2 \times 2}}$$

$$2 \times 2 \times 2$$

$$8$$

$$5. 4913 = \cancel{17 \times 17 \times 17}$$

Perfect Cube

Ans

$$6.a) \begin{aligned} 420 &= \cancel{2} \times \cancel{2} \times 5 \times 7 \times \cancel{3} \\ 864 &= \cancel{2} \times \cancel{2} \times 2 \times 2 \times 2 \times \cancel{3} \times 3 \times 3 \end{aligned}$$

$$\begin{aligned} \text{GCF} &= 2 \times 2 \times 3 \\ &= 4 \times 3 \\ &= 12 \end{aligned}$$

$$\begin{aligned}
 6 \text{ b) } 36 &= 2 \times 2 \times 2 \times 2 \times 2 = 2^5 \\
 48 &= 2 \times 2 \times 2 \times 2 \times 3 = 2^4 \times 3 \\
 72 &= 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2
 \end{aligned}$$

$$\begin{aligned}
 \text{GCF} &= 2 \times 2 \times 2 \\
 &= 8
 \end{aligned}$$

$$\begin{aligned}
 \text{LCM} \quad 7. \text{ a) } 12 &= 2 \times 2 \times 3 = 2^2 \times 3 \\
 40 &= 2 \times 2 \times 2 \times 5 = 2^3 \times 5
 \end{aligned}$$

$$\begin{aligned}
 \text{LCM} &= 2^3 \times 3 \times 5 \\
 &= 8 \times 3 \times 5 \\
 &= 120
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } 16 &= 2 \times 2 \times 2 \times 2 = 2^4 \\
 25 &= 5 \times 5 = 5^2 \\
 30 &= 2 \times 3 \times 5 = 2 \times 3 \times 5
 \end{aligned}$$

$$\begin{aligned}
 \text{LCM} &= 2^4 \times 5^2 \times 3 \\
 &= 16 \times 25 \times 3 \\
 &= 1200
 \end{aligned}$$

8. $74088 \text{ cm}^3 = \text{Volume}$

$$\sqrt[3]{74088} = \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7}$$

$$\rightarrow 42$$

"edge" side length

$$\begin{aligned} SA &= L \times W \\ &= 42 \times 42 \\ &= 1764 \times 6 \text{ sides} \\ &= 10584 \text{ cm}^2 \end{aligned}$$

9. 5400 cm^2
 $\div 6$

$$900 \text{ cm}^2$$

$$\sqrt{900} = \sqrt{2 \times 2 \times 5 \times 5 \times 3 \times 3}$$

$$= 30 \leftarrow \text{"edge" length.}$$

$$\begin{aligned} V &= L \times W \times H \\ &= 30 \times 30 \times 30 \\ &= 27000 \text{ cm}^3 \end{aligned}$$

10. GCF

$$\begin{aligned} 48 &= (2 \times 2) \times 2 \times 2 \times 3 \\ 60 &= (2 \times 2) \times (3 \times 5) \\ 84 &= (2 \times 2) \times (3 \times 7) \end{aligned}$$

$$2 \times 2 \times 3$$

$$12$$

11. a) $4 \sqrt[3]{12}$

$$\sqrt[3]{12 \times 4 \times 4}$$

$$\sqrt[3]{192}$$

b) $5 \sqrt[3]{5}$

$$\sqrt[3]{5 \times 5 \times 5}$$

$$\sqrt[3]{125}$$

c) $7 \sqrt[3]{11}$

$$\sqrt[3]{11 \times 7 \times 7 \times 7}$$

$$\sqrt[3]{3773}$$

$$11. d) \quad 3 \sqrt[3]{10}$$

$$\sqrt[3]{10 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$\sqrt[3]{2430}$$

$$12. a) \quad \sqrt[3]{243}$$

$$\sqrt[3]{3 \times 3 \times 3 \times 3 \times 3}$$

$$3 \sqrt[3]{3}$$

$$b) \quad 5 \sqrt[3]{48}$$

$$5 \sqrt[3]{2 \times 2 \times 2 \times 2 \times 3}$$

$$5 \times 2 \sqrt[3]{6}$$

$$10 \sqrt[3]{6}$$

$$c) \quad \sqrt[3]{1080}$$

$$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5}$$

$$6 \sqrt[3]{5}$$

$$12. d) \sqrt[3]{2592}$$

$$\sqrt[3]{\underbrace{2 \times 2 \times 2 \times 2 \times 2}_{2^5} \times \underbrace{3 \times 3 \times 3 \times 3}_{3^4}}$$

$$2 \sqrt[3]{81}$$

$$13. 1080 \text{ cm}^3$$

$$\sqrt[3]{1080} = \sqrt[3]{\underbrace{2 \times 2 \times 2 \times 3 \times 3 \times 3}_{2^3 \times 3^3} \times 5}$$

$$6 \sqrt[3]{5}$$

$$14. \frac{37800 \text{ cm}^3}{\div 6}$$

$$6300 \text{ cm}^3$$

$$\sqrt[3]{6300} = \sqrt[3]{\underbrace{2 \times 2 \times 5 \times 5}_{2^2 \times 5^2} \times \underbrace{3 \times 3 \times 7}_{3^2 \times 7}}$$

$$= 30 \sqrt[3]{7}$$

