

Grade 8

NUMBER SENSE AND NUMERATION: SQUARE ROOTS

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Answers:

1. a. 5 b. 7 c. 11 d. 3 e. 0 f. 8
g. 6 h. 2 i. 9 j. 10 k. 1 l. 16
m. 15 n. 13 o. 14 p. 20 q. 25 r. 32

2. a. $\frac{7}{6}$ b. $\frac{11}{8}$ c. $\frac{5}{4}$ d. $\frac{5}{2}$ e. $\frac{4}{5}$ f. 0
g. 3 h. 2 i. $\frac{5}{2}$ j. $\frac{2}{3}$ k. $\frac{2}{3}$ l. $\frac{6}{7}$

3. a. x. 0.9 (note when estimating this question use $\sqrt{0.90}$, thus $\sqrt{0.81} < \sqrt{0.90} < \sqrt{1.00}$ and since 0.90 is closer to 0.81 the answer is closer to 0.9.

- b. i. 3.5 ii. 4.2 iii. 5.4 iv. 8.5 v. 9.1
vi. 10.9 vii. 0.5 viii. 1.2 ix. 1.5 x. 0.9

4. 49.92 km 5. 10 cm

6. a. i. 16 cm^2 ii. 144 cm^2 iii. 200 cm^2
b. i. 4 cm ii. 12 cm iii. $\sqrt{200}$ cm or approximately 14.14 cm

7. a. 15 cm b. 24 cm c. 14 cm d. 20 cm e. $\sqrt{3}$ f. $\sqrt{2}$

8. a. 5 cm b. 13 cm c. 25 cm d. 41 cm e. 61 cm f. 85 cm

9. a. $\sqrt{\frac{50}{32}}$
 $= \sqrt{\frac{25}{16}}$
 $= \frac{\sqrt{25}}{\sqrt{16}}$
 $= \frac{5}{4}$
- b. $\sqrt{\frac{128}{450}}$
 $= \sqrt{\frac{64}{225}}$
 $= \frac{8}{15}$
- c. $\sqrt{\frac{48}{147}}$
 $= \sqrt{\frac{16}{49}}$
 $= \frac{4}{7}$
- d. $\frac{\sqrt{45}}{\sqrt{125}}$
 $= \frac{\sqrt{9 \times 5}}{\sqrt{25 \times 5}}$
 $= \frac{\sqrt{9} \times \sqrt{5}}{\sqrt{25} \times \sqrt{5}}$
 $= \frac{3}{5}$
- e. $\frac{\sqrt{288}}{\sqrt{200}}$
 $= \frac{\sqrt{144 \times 2}}{\sqrt{100 \times 2}}$
 $= \frac{\sqrt{144} \times \sqrt{2}}{\sqrt{100} \times \sqrt{2}}$
 $= \frac{12}{10}$
 $= \frac{6}{5}$

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10. There are 6 equal surface areas for a cube.

Each surface (a square) has an area of $\frac{1176}{6} = 196\text{cm}^2$.

Each edge of square has a length of $\sqrt{196}$ cm or 14 cm.

Therefore, the length of one of the edges of the cube is 14 cm.

11. a. $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $a = 7$, $b = 24$, $c = 25$ and so $s = \frac{7+24+25}{2} = 28$

$$A = \sqrt{28(28-7)(28-24)(28-25)}$$

$$= \sqrt{28(21)(4)(3)}$$

$$= \sqrt{7056}$$

$$= 84$$

Therefore, the area of the triangle is 84 cm^2 .

The formula $A = \frac{bh}{2}$ can be used because a triangle with sides 7, 24 and 25 is a

right angled triangle. First determine that $25^2 = 625$, $7^2 = 49$ and $24^2 = 576$.

Since $625 = 49 + 576$, the triangle is right angled at the vertex opposite the longest side of length 25. The side with length 25 is the hypotenuse. The right angle is across from the hypotenuse (the longest side).

- b. $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $a = 16$, $b = 16$, $c = 8$ and so $s = \frac{16+16+8}{2} = 20$

$$A = \sqrt{20(20-16)(20-16)(20-8)}$$

$$= \sqrt{20(4)(4)(12)}$$

$$= \sqrt{3840}$$

$$\doteq 61.96773354$$

$$\doteq 62 \text{ to the nearest unit.}$$

Therefore, the area of the triangle is 62 cm^2 .

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12. The area of the square is 98cm^2 .

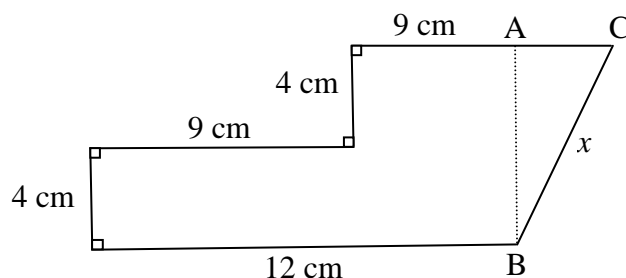
Each edge of the square has a length of $\sqrt{98}$ cm.

Using the Pythagorean Theorem the diameter is

$$\begin{aligned} d &= \sqrt{(\sqrt{98})^2 + (\sqrt{98})^2} \\ &= \sqrt{98 + 98} \\ &= \sqrt{196} \\ &= 14 \end{aligned}$$

The radius is half the diameter and is equal to 7 cm.

- 13.



The length of AB is 8 cm ($4 + 4$). The length of AC is 6 cm ($9 + 9 - 12$). Angle BAC is 90° and so triangle BAC is right angled at vertex A .

Using the Pythagorean Theorem,

$$\begin{aligned} x^2 &= 6^2 + 8^2 \\ x^2 &= 36 + 64 \\ x^2 &= 100 \\ x &= \sqrt{100} \\ x &= 10 \end{aligned}$$

14.
$$\begin{aligned} &\sqrt{1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3 + 10^3} \\ &= \sqrt{(1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10)^2} \\ &= \sqrt{(55)^2} \\ &= 55 \end{aligned}$$