

Square and Square Roots

QUESTIONS

1. $\frac{(\sqrt{32} + \sqrt{48})}{(\sqrt{8} + \sqrt{12})} = ?$
(a) $\sqrt{2}$ (b) 2 (c) 4 (d) 8
2. If $\sqrt{2} = 1.41$, then $\frac{1}{\sqrt{2}} =$
(a) 0.375 (b) 0.378 (c) 0.705 (d) 7.05
3. If $x = \sqrt{100}$, then find the value of $\frac{x^3 + x^2}{x}$
(a) 120 (b) 100 (c) 110 (d) none of these
4. $x = \sqrt{3018 + \sqrt{36 + \sqrt{169}}}$, the value of x is
(a) 55 (b) 44 (c) 63 (d) 42
5. $\sqrt{0.9 \times 0.09 \times x} = 0.9 \times 0.09 \times \sqrt{z}$. Then the value of $\frac{x}{z}$ is
(a) 0.081 (b) 0.810 (c) 0.081 (d) 8.09
6. $\sqrt{\frac{169}{x}} = 1.30$, then the value of x is
(a) 100 (b) 1000 (c) 10 (d) 10000
7. The greatest six digit number which is a perfect square is
(a) 998004 (b) 998006 (c) 998049 (d) 998001
8. $\sqrt{1 + \frac{x}{144}} = \frac{13}{12}$, then find the value of x
(a) 12 (b) 13 (c) 25 (d) 50
9. A society collected Rs. 2304 as fees from its students. If each student paid as much rupees as there were students in the school, how many students were there in the school?
(a) 48 (b) 50 (c) 38 (d) 40

10. Find the least square number which is exactly divisible by each of the numbers 6, 9, 15 and 20.
 (a) 32400 (b) 16200 (c) 8100 (d) 129600
11. What is the square root of least six-digit number which is a perfect square?
 (a) 315 (b) 316 (c) 317 (d) 318
12. What least number must be subtracted from 7250 to get a perfect square?
 (a) 22 (b) 23 (c) 24 (d) 25
13. Which of the following is equal to $\frac{\sqrt{59.29} - \sqrt{5.29}}{\sqrt{59.29} + \sqrt{5.29}}$
 (a) 0.74 (b) 0.64 (c) 0.44 (d) 0.54
14. A general arranges his soldiers in rows to form a perfect square. He finds that in doing so, 60 soldiers are left out, when the total number of soldiers is 8160. What is the number of soldiers in each row?
 (a) 100 (b) 90 (c) 80 (d) 70
15. Find the square root of 0.000529
 (a) 0.023 (b) 0.027 (c) 0.023 (d) 0.037
16. If $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$, then find the value of, $\sqrt{\frac{800}{45}}$
 (a) 5.214 (b) 4.216 (c) 4.214 (d) 5.216
17. Simplify: $\frac{\sqrt{1024} - \sqrt{324}}{\sqrt{441} + \sqrt{196}}$
 (a) $\frac{2}{5}$ (b) $\sqrt{\frac{2}{5}}$ (c) $\sqrt{\frac{8}{5}}$ (d) $\sqrt{\frac{6}{25}}$
18. If $\sqrt{4096} = 64$, then find the value of $\sqrt{4096} + \sqrt{40.96} + \sqrt{0.004096}$
 (a) 70.646 (b) 60.464 (c) 70.464 (d) 40.646
19. Find the value of 'y' such that $\sqrt{188 + \sqrt{53 + \sqrt{y}}} = 14$
 (a) 121 (b) 11 (c) 1331 (d) 161
20. If $\sqrt{1 + \frac{25}{144}} = 1 + \frac{p}{12}$, then find the value of p for which this is satisfied.

(a) 3

(b) 1

(c) -1

(d) 2

21. Find the value of y in the expression, $\sqrt{1 + \sqrt{1 - \frac{2176}{2401}}} = 1 + \frac{y}{7}$

(a) 1

(b) 5

(c) 2

(d) 7

22. Find the square root of 15876.

(a) 126

(b) 144

(c) 184

(d) 156

23. Simplify $\sqrt{3\frac{33}{289}}$

(a) $\frac{3}{17}$

(b) $\frac{30}{17}$

(c) $\frac{33}{17}$

(d) $\frac{11}{17}$

24. Find the value of $\sqrt{2\sqrt{2\sqrt{2\sqrt{2\sqrt{2}}}}}$

(a) $2^{\frac{1}{31}}$

(b) $2^{\frac{1}{32}}$

(c) $2^{\frac{31}{32}}$

(d) $2^{\frac{30}{31}}$

25. Simplify the given expression and find the value of the expression.

$$\sqrt{\frac{0.256 \times 0.081 \times 4.356}{1.5625 \times 0.0121 \times 129.6 \times 64}}$$

(a) 10.96

(b) 0.024

(c) 2.196

(d) 4.096

26. If $a = \sqrt{2} + 1$ and $b = \sqrt{2} - 1$, then find the value of $\frac{a^2 + ab + b^2}{a^2 - ab + b^2}$

(a) $32 - 4\sqrt{2}$

(b) $32 + 4\sqrt{2}$

(c) 0

(d) $\frac{7}{5}$

27. Find the value of the given expression $2 + \frac{1}{\sqrt{2}} + \frac{1}{2 + \sqrt{2}} + \frac{1}{\sqrt{2} - 2}$?

(a) $2 + \frac{1}{\sqrt{2}}$

(b) $-\frac{1}{\sqrt{2}}$

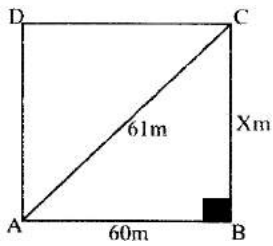
(c) $2 - \frac{1}{\sqrt{2}}$

(d) $\frac{1}{\sqrt{2}}$

28. The length of the diagonal of a rectangular paddock is 61m and the length of one side is 60m. Find:

(A) The width of the paddock

(B) The length of the fencing needed to enclose the paddock

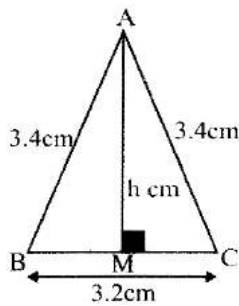


- (a) 11m, 142m (b) 13m, 146m (c) 11m, 146m (d) 13m, 142m

29. Use the information given in the diagram to find.

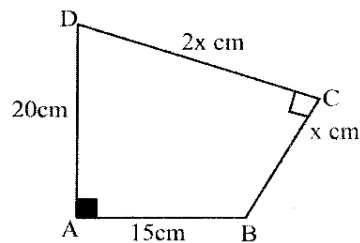
(A) Height of the triangle

(B) The area of the triangle.



- (a) 5 cm, 6.8 cm^2 (b) 3 cm, 4.8 cm^2 (c) 3 cm, 6.8 cm^2 (d) 6 cm, 4.8 cm^2

30. Use the information given in the diagram to find the value of x.



- (a) $3\sqrt{5}$ (b) $6\sqrt{5}$ (c) $2\sqrt{5}$ (d) $5\sqrt{5}$

ANSWER - KEY

1. (b)	2. (c)	3. (c)	4. (a)	5. (c)	6. (a)	7. (d)	8. (c)	9. (a)	10. (d)
11. (c)	12. (d)	13. (d)	14. (b)	15. (a)	16. (b)	17. (a)	18. (c)	19. (a)	20. (b)
21. (a)	22. (a)	23. (b)	24. (c)	25. (b)	26. (d)	27. (c)	28. (a)	29. (b)	30. (d)

Answers and Solutions

1. (b) $\frac{\sqrt{32} + \sqrt{38}}{\sqrt{8} + \sqrt{12}} \times \frac{\sqrt{8} - \sqrt{12}}{\sqrt{8} - \sqrt{12}} = \frac{(4\sqrt{2} + 4\sqrt{3}) \times (2\sqrt{2} - 2\sqrt{3})}{(8 - 12)}$
 $= -2 \times (2 - 3) = +2.$

2. (c): $\frac{1}{\sqrt{2}} = \frac{1}{1.41} = 0.705.$

3. (c): $x = 10 \Rightarrow \frac{x^3 + x^2}{x} = \frac{1000 + 100}{100}$
 $= \frac{1100}{100} = 110$

4. (a): $\sqrt{3018 + \sqrt{36 + \sqrt{169}}}$
 $= \sqrt{3018 + \sqrt{36 + \sqrt{13}}}$
 $= \sqrt{3018 + \sqrt{49}}$
 $= \sqrt{3018 + 7} = \sqrt{3025} = 55$

5. (c): $\sqrt{0.9 \times 0.09 \times x} = 0.9 \times 0.09 \times \sqrt{z}$
 $\Rightarrow \frac{\sqrt{x}}{\sqrt{z}} = \frac{0.9 \times 0.09}{\sqrt{0.9 \times 0.09}}$

Squaring, $\frac{x}{z} = \frac{(0.9 \times 0.09)^2}{0.9 \times 0.09} = 0.9 \times 0.09 = 0.081.$

6. (a): $\sqrt{\frac{169}{x}} = 1.3$
 $\Rightarrow \frac{169}{x} = 1.69$
 $\Rightarrow x = 100.$

7. (d): $\sqrt{998001}$
 $= \sqrt{(1000 - 1)^2}$
 $= 1000 - 1 = 999.$

8. (c): $\sqrt{1 + \frac{x}{144}} = \frac{13}{12}$

$$1 + \frac{x}{144} = \frac{169}{12}$$

$$\text{Squaring, } \Rightarrow \frac{x}{144} = \frac{169}{144}$$

9. (a): no. of students = n

Fee amount paid by each students = n

$$\text{Total fee} = n \times n = n^2$$

$$n^2 = 2304$$

$$= n = 48$$

10. (a): LCM of 6, 9, 15, 20

$$6 \times 9 \times 15 \times 20 = 16200$$

MULTIPLES of 16200 are 32400, 48600 & C.

$$32400 = (180)^2$$

Answer is: 32400.

11. (c): Least Six digit no, being a perfect square is 100489

Its square root = 317.

12. (c): $7250 - 25 = 7225 = (85)^2$.

13. (d): $\sqrt{5.29} = 2.3$ $\sqrt{59.29} = 7.7$

$$\text{We get: } = \frac{7.7 - 2.3}{7.7 + 2.3} = \frac{5.4}{10} = 0.54 = 0.54.$$

14. (b): 60 Soldiers left

$$\Rightarrow \text{perfect square} = 8160 - 60 = 8100.$$

15. (c): $\sqrt{0.000529} = \sqrt{7529 \times 10^{-6}}$

$$= 23 \times 10^{-3} = 0.023.$$

16. (b) $\sqrt{\frac{800}{45}} = \sqrt{\frac{2 \times 400}{9 \times 5}} = \frac{\sqrt{2}}{\sqrt{5}} \times \frac{20}{3}$

$$= \frac{1.414}{1.732} \times \frac{20}{3} = 4.216$$

$$\begin{aligned} 17. \quad (a) \quad & \frac{\sqrt{1024} - \sqrt{324}}{\sqrt{441} + \sqrt{196}} = \frac{32 - 18}{21 + 14} \\ & = \frac{14}{35} = \frac{2}{5} \end{aligned}$$

$$\begin{aligned} 18. \quad (c): \text{Value } & 64 + \sqrt{4096 \times 10^{-2}} + \sqrt{4096 \times 10^{-6}} \\ & = 64 + 64 \times 10^{-1} + 64 \times 10^{-3} \\ & = 64 + 6.4 + 0.64 \\ & = 70.464 \end{aligned}$$

$$\begin{aligned} 19. \quad (a): & 188 + \sqrt{53 + \sqrt{y}} = 196 \\ & = \sqrt{53 + \sqrt{y}} = 8 \\ \text{Squaring, } & 53 + \sqrt{y} = 64 \Rightarrow \sqrt{y} = 11 \\ & y = 121. \end{aligned}$$

$$\begin{aligned} 20. \quad (b): & 1 + \sqrt{\frac{25}{144}} = \sqrt{\frac{169}{144}} = \frac{13}{12} \\ \Rightarrow & \frac{13}{12} - 1 = \frac{1}{12} \\ \Rightarrow & \frac{1}{12} = \frac{p}{12} \Rightarrow p = 1 \end{aligned}$$

$$\begin{aligned} 21. \quad (a): & \sqrt{1 + \sqrt{1 - \frac{2176}{2401}}} = \sqrt{1 + \sqrt{\frac{225}{2401}}} \\ & = 1 + \sqrt{\frac{15}{45}} = \sqrt{\frac{64}{49}} = \frac{8}{7} \\ \therefore & \frac{8}{7} = 1 + \frac{y}{7} \Rightarrow y = 1 \end{aligned}$$

$$22. \quad (a): \sqrt{15876} = \sqrt{(125 + 1)^2} = 126.$$

$$23. \quad (b): \sqrt{3 \frac{33}{289}} = \sqrt{\frac{900}{287}} = \frac{30}{17}$$

24. (b): $y = \sqrt{2\sqrt{2\sqrt{2\sqrt{2\sqrt{2}}}}}$

$$y^2 = 2\sqrt{2\sqrt{2\sqrt{2\sqrt{2}}}}$$

$$y^4 = 8\sqrt{2\sqrt{2\sqrt{2}}}$$

$$y^8 = 128\sqrt{2\sqrt{2}}$$

$$y^{16} = (128)^2 \times 2\sqrt{2}$$

Then $y^{32} = (128)^4 \times 4 \times 2$

$$y^{32} = 2^{28+2+1} = 2^{31}$$

25. (a): $\sqrt{256} = 16$

$$\sqrt{81} = 9$$

$$\sqrt{4356} = 66$$

$$\sqrt{15625} = 125$$

$$\sqrt{121} = 11$$

$$\sqrt{1296} = 36$$

$$\text{Expression, } = \sqrt{\frac{256 \times 10^{-3} \times 81 \times 10^{-3} \times 4356 \times 10^{-3}}{15625 \times 10^{-4} \times 121 \times 10^{-4} \times 1296 \times 10^{-1} \times 64}}$$

$$= \sqrt{\frac{16 \times 9^2 \times 66^2 \times \cancel{10^{-9}}}{125^2 \times 11^2 \times 36^2 \times 8^2 \times \cancel{10^{-9}}}}$$

$$= \frac{16 \times 9 \times 66}{125 \times 11 \times 36 \times 8} = 0.024$$

26. (d): Not Available

27. (c): Rationalizing, we get

$$2 + \frac{\sqrt{2}}{2} + \frac{2 - \sqrt{2}}{2} + \frac{2 + \sqrt{2}}{-2}$$

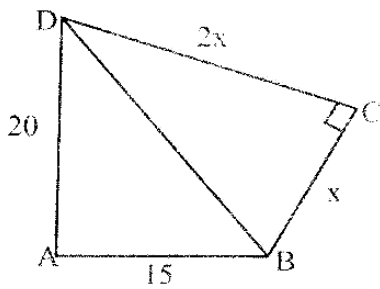
$$= 2 + \frac{\cancel{\sqrt{2}} + \cancel{\sqrt{2}} - \cancel{\sqrt{2}} - 2 - \sqrt{2}}{2}$$

$$= 2 - \frac{\sqrt{2}}{2} = 2 - \frac{1}{\sqrt{2}}$$

28. (a) Width = $\sqrt{61^2 - 60^2}$
 $= \sqrt{3721 - 3600}$
 Fencing = $2 \times (1 + b) = 2 \times (60 + 11) = 142$

29. (b): $h = \sqrt{3.4^2 - 1.6^2}$
 $= \sqrt{(3.4 + 1.6)(3.4 - 1.6)}$
 $= 3.0 \text{ cm}$
 Area = $\frac{1}{2} \times 3 \times 3.2 = 4.8 \text{ cm}^2$.

30. (d): Join BD



IN $\triangle ABD$, $BD = \sqrt{20^2 + 15^2} = 25$

IN $\triangle BCD$, $\sqrt{x^2 + 4x^2} = 25$

$= \sqrt{5x} = 25$

$x = \frac{25}{\sqrt{5}}, = 5\sqrt{5}$.