[10]

*** Choose the right answer from the given options. [1 Marks Each]**

1. π is:
   (A) A whole number. (B) An integer. (C) An irrational number. (D) A rational number.

   Ans. :
   c. An irrational number.
   Solution:
   π = 3.14159265359..., which is non-terminating non-recurring.
   Hence, it is an irrational number.

2. The value of $\sqrt[4]{\sqrt[3]{2^2}}$ is:
   (A) $2^{\frac{1}{6}}$ (B) 2^6 (C) 2^{-6} (D) $2^{\frac{-1}{6}}$

   Ans. :
   a. $2^{\frac{1}{6}}$
   Solution:
   $\sqrt[4]{\sqrt[3]{2^2}}$
   $= \sqrt[4]{\sqrt{2^{\frac{2}{3}}}}$
   $= 2^{\frac{2}{3\times4}} = 2^{\frac{1}{6}}$

3. $(1296)^{\frac{-1}{4}} =$
   (A) $-\frac{1}{6}$ (B) -6 (C) 6 (D) $\frac{1}{6}$

   Ans. :
   d. $\frac{1}{6}$
   Solution:
   $(1296)^{\frac{-1}{4}} = (6^4)^{\frac{-1}{4}}$
   $= (6)^{-1} = \frac{1}{6}$

4. If $x = (7 + 4\sqrt{3})$ than $\left(x + \frac{1}{x}\right) = ?$
   (A) 49 (B) 14 (C) 48 (D) $8\sqrt{3}$

   Ans. : b. 14

   Solution :

   $x = (7 + 4\sqrt{3})$
   $\frac{1}{x} = \frac{1}{7+4\sqrt{3}} = (7 - 4\sqrt{3})$
   $x + \frac{1}{x} = (7 + 4\sqrt{3}) + (7 - 4\sqrt{3})$
   $= 14$

5. The value of $\sqrt{20} \times \sqrt{5}$ is :
   (A) 10 (B) $4\sqrt{5}$ (C) $2\sqrt{5}$ (D) $20\sqrt{5}$

   Ans. :
   a. 10
   Solution:
   $\sqrt{20} \times \sqrt{5}$
   $= 2\sqrt{5} \times \sqrt{5}$
   $= 2 \times 5$
   $= 10$

6. On simplification $(3 + \sqrt{3})(3 - \sqrt{3})$ gives:
   (A) $-2\sqrt{3}$ (B) 0 (C) 16 (D) 6

   Ans. :

d. $\frac{1}{8}$

Solution:

We know that,

$(a + b)(a - b) = a^2 - b^2$

So, here

$(4 + \sqrt{3})(3 - \sqrt{3}) = 3^2 - (\sqrt{3})^2$

$\Rightarrow 9 - 3 - 6$

7. The simplest from of $0.\overline{36}$ is:

(A) $\frac{36}{100}$ (B) $\frac{4}{11}$ (C) $\frac{4}{9}$ (D) None of these.

Ans. :

b. $\frac{4}{11}$

Solution:

$0.\overline{36} = \frac{36}{36} = \frac{4 \times 9}{11 \times 9}$

$\frac{4}{11}$

8. If $\sqrt{2} = 1.4142$, then $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ is equal to:

(A) 0.323223222322223 (B) $\sqrt{180}$ (C) $\sqrt{31}$ (D) $\sqrt{196}$

Ans. :

d. $\sqrt{196}$

Solution:

Because it is the square of 14 and can be Written in the form of $\frac{p}{q}$.

9. A number is an irrational if and only if its decimal representation is

(A) non-terminating (B) non-terminating and repeating

(C) non-terminating and non-repeating (D) terminating

Ans. : (C) non-terminating and non-repeating

10. The simplest rationalisation factor of $\sqrt[3]{500}$ is:

a. $\sqrt{5}$

b. $\sqrt{3}$

c. $\sqrt[3]{5}$

d. $\sqrt[3]{2}$

Ans. :

d. $\sqrt[3]{2}$

Solution:

$\sqrt[3]{500} = 500^{\frac{1}{3}} = \left(\frac{500 \times 2}{2}\right)^{\frac{1}{3}} = \left(\frac{1000}{2}\right)^{\frac{1}{3}} = \frac{10^{3 \times \frac{1}{3}}}{2^{\frac{1}{3}}} = \frac{10}{\sqrt[3]{2}}$

Thus, the simplest rationalisation factor of $\sqrt[3]{500}$ is $\sqrt[3]{2}$.

Hence, the correct option is (d).

*** Answer the following short questions. [2 Marks Each]** **[6]**

11. How many irrational numbers lie between $\sqrt{2}$ and $\sqrt{3}$? Find any three irrational numbers lying between $\sqrt{2}$ and $\sqrt{3}$.

Ans. : There are infinite number of irrational numbers lying between $\sqrt{2}$ and $\sqrt{3}$.

As, $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$

So, the three irrational numbers lying between $\sqrt{2}$ and $\sqrt{3}$ are:

1.420420042000..., 1.505005000... and 1.616116111...

12. Multiply:

$6\sqrt{15}$ by $4\sqrt{3}$

Ans. : $6\sqrt{15}$ by $4\sqrt{3}$

$6\sqrt{15} \times 4\sqrt{3} = 6 \times 4 \times \sqrt{15} \times \sqrt{3}$

$= 24 \times \sqrt{15 \times 3}$

$= 24 \times \sqrt{3 \times 5 \times 3}$

$= 24 \times 3\sqrt{5} = 72\sqrt{5}$

13. Write the following in decimal form and say what kind of decimal expansion has.

$\frac{7}{25}$

Ans. : $\frac{7}{25} = 0.28$

By actual division, we have:

$$
\begin{array}{r}
0.28 \\
25\overline{)\,70} \\
-50 \\
\hline
200 \\
-200 \\
\hline
00 \\
\hline
\end{array}
$$

It is a terminating decimal expansion.

*** Answer the following questions. [3 Marks Each]** **[9]**

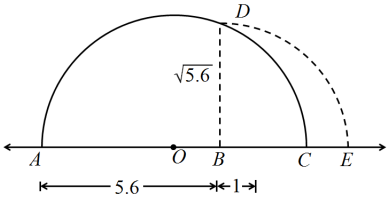
14. Represent geometrically the following numbers on the number line:

$\sqrt{5.6}$

Ans. : Firstly, we draw a line segment AB = 5.6 units and extend it to C such that BC = 1 unit. Let O be the mid-point of AC. Now, draw a semi-circte with centre O and radius OA. Let us draw BD perpendicular to AC passing through point B and intersecting the semi-circle at point D.

Hence, the distance BD is $\sqrt{5.6}$ units. units.

Draw an arc with centre B and radius BD, meeting AC produced at E, then BE = BD = $\sqrt{5.6}$ units.



15. Find the values of a and b in the following:

$\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a - 6\sqrt{3}$

Ans. : $\text{LHS} = \frac{5+2\sqrt{3}}{7+4\sqrt{3}} = \frac{5+2\sqrt{3}}{7+4\sqrt{3}} \times \frac{7-4\sqrt{3}}{7-4\sqrt{3}}$

$= \frac{(5+2\sqrt{3})(7-4\sqrt{3})}{(7)^2-(4\sqrt{3})^2}$

$= \frac{35+20\sqrt{3}+14\sqrt{3}-24}{49-48}$

$= \frac{11-6\sqrt{3}}{1} = 11 - 6\sqrt{3}$

Now, $11 - 6\sqrt{3} = a - 6\sqrt{3}$

$\Rightarrow a = 11$

16. Represent geometrically the following numbers on the number line:

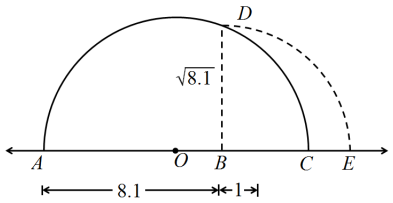
$\sqrt{8.1}$

Ans. : Firstly, we draw a line segment AB = 8.1 units and extend it toC such that SC = 1 unit. Let O be the mid-point of AC. Now, draw a semi-circle with centre 0 and radius OA.

Let us draw BD perpendicular to AC passing through point 6 intersecting the semi-circle at point D.

Hence, the distance BD is $\sqrt{8.1}$ units.

Draw an arc with centre Sand radius BD, meeting AC produced at E, then BE = BD = $\sqrt{8.1}$ units.



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