## Exercise-2·9

Multiple choice questions

(1) If $n$ is a natural number then $\sqrt{n}$ is
(1) always a natural number (2) always an irrational number
(3) always a rational number (4) may be rational or irrational.

⇒ (4) may be rational or irrational.

(2) Which of the following is not true?
(1) Every rational number is a real number.
(2) Every integer is a rational number.
(3) Every real number is an irrational number.
(4) Every natural number is a whole number.

⇒ (3) Every real number is an irrational number.

(3) Which one of the following regarding sum of two irrational numbers, is true?
(1) always an irrational number
(2) may be a rational or irrational number.
(3) always a rational number.
(4) always an integer.

⇒ (2) may be a rational or irrational number.

(4) Which one of the following has a terminating decimal expansion?
(1) $\frac{5}{64}$ (2) $\frac{8}{9}$ (3) $\frac{14}{15}$ (4) $\frac{1}{12}$

⇒ (1) $\frac{5}{64} = 0.078125$

(5) Which one of the following, is an irrational number
(1) $\sqrt{25}$ (2) $\sqrt{9/4}$ (3) $\frac{7}{11}$ (4) $\pi$

⇒ (4) $\pi$

(6) An irrational number between 2 and 2·5 is
(1) $\sqrt{11}$ (2) $\sqrt{5}$ (3) $\sqrt{2.5}$ (4) $\sqrt{8}$

⇒ (2) $\sqrt{5} = 2.236$

(7) The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates with one place of decimal is

(1) $\frac{1}{10}$ (2) $\frac{3}{10}$ (3) 3 (4) 30

⇒ (2) $\frac{3}{10}$

(8) If $\frac{1}{7} = 0.\overline{142857}$ then the value of $5/7$ is

(1) $0.\overline{142857}$ (2) $0.\overline{714285}$ (3) $0.\overline{571428}$ (4) $0.714285$

⇒ $\frac{5}{7} = 5 \times \frac{1}{7} = 5 \times 0.\overline{142857} = 0.\overline{714285}$ (2)

(9) Find the odd one out of the following.

(1) $\sqrt{32} \times \sqrt{2}$ (2) $\frac{\sqrt{27}}{\sqrt{3}}$ (3) $\sqrt{72} \times \sqrt{8}$ (4) $\frac{\sqrt{54}}{\sqrt{18}}$

⇒ $\sqrt{32} \times \sqrt{2} = 4 \times 2 = 8$, $\frac{\sqrt{27}}{\sqrt{3}} = \frac{9 \times \sqrt{3}}{\sqrt{3}} = 9$

$\sqrt{72} \times \sqrt{8} = \sqrt{36} \times \sqrt{16} = 6 \times 4 = 24$, $\frac{\sqrt{54}}{\sqrt{18}} = \sqrt{\frac{54}{18}} = \sqrt{3}$ (4)

(10) $0.\overline{34} + 0.\overline{34} =$

(1) $0.\overline{687}$ (2) $0.\overline{68}$ (3) $0.6\overline{8}$ (4) $0.68\overline{7}$

⇒ $0.\overline{34} + 0.\overline{34}$

$= \frac{34}{99} + \frac{34}{99}$

$= \frac{68}{99} = 0.6868 = 0.\overline{687}$ (1)

(11) Which of the following statement is false?

(1) The square root of 25 is 5 or -5 (3) $\sqrt{25} = 5$

(2) $-\sqrt{25} = -5$ (4) $\sqrt{25} = \pm 5$

⇒ $\sqrt{25} = \pm 5$ (4)

(12) Which one of the following is not a rational number?

(1) $\sqrt{\frac{8}{18}}$ (2) $7/3$ (3) $\sqrt{0.01}$ (4) $\sqrt{13}$

⇒ $\sqrt{13}$ (4)

(13) $\sqrt{27} + \sqrt{12} =$

(1) $\sqrt{39}$ (2) $5\sqrt{6}$ (3) $5\sqrt{3}$ (4) $3\sqrt{5}$

$\Rightarrow \sqrt{27} + \sqrt{12}$

$= 3\sqrt{3} + 2\sqrt{3}$

$= 5\sqrt{3}$ (3)

(14) If $\sqrt{80} = k\sqrt{5}$ ; then $k =$

(1) 2 (2) 4 (3) 8 (4) 16

$\Rightarrow \sqrt{80} = k\sqrt{5}$

$\sqrt{5 \times 16} = k\sqrt{5}$

$4\sqrt{5} = k\sqrt{5}$

$k = 4$ (2)

(15) $4\sqrt{7} \times 2\sqrt{3} =$

(1) $6\sqrt{10}$ (2) $8\sqrt{21}$ (3) $8\sqrt{10}$ (4) $6\sqrt{21}$

$\Rightarrow 4\sqrt{7} \times 2\sqrt{3}$

$= 8 \times \sqrt{7 \times 3} = 8\sqrt{21}$ (2)

(16) When written with a rational denominator, the expression $\frac{2\sqrt{3}}{3\sqrt{2}}$ can be simplified as

(1) $\frac{\sqrt{2}}{3}$ (2) $\frac{\sqrt{3}}{2}$ (3) $\frac{\sqrt{6}}{3}$ (4) $\frac{2}{3}$

$\Rightarrow \frac{2\sqrt{3}}{3\sqrt{2}} = \frac{2\sqrt{3} \times \sqrt{2}}{3 \times 2} = \frac{2\sqrt{6}}{6} = \frac{\sqrt{6}}{3}$ (3)

(17) When $(2\sqrt{5} - \sqrt{2})^2$ is simplified, we get

(1) $4\sqrt{5} + 2\sqrt{2}$ (2) $22 - 4\sqrt{10}$ (3) $8 - 4\sqrt{10}$ (4) $2\sqrt{10} - 2$

$\Rightarrow (2\sqrt{5} - \sqrt{2})^2 = 4 \times 5 - 2 \cdot 2\sqrt{5} \cdot \sqrt{2} + 2$

$= 20 - 4\sqrt{10} + 2$

$= 22 - 4\sqrt{10}$ (2)

(18) $(0.000729)^{-3/4} \times (0.09)^{-3/4} =$ ____

(1) $\frac{103}{3^3}$ (2) $\frac{105}{35}$ (3) $\frac{102}{32}$ (4) $\frac{106}{36}$

$$\Rightarrow (0.000729)^{-3/4} \times (0.09)^{-3/4}$$

$$= (729 \times 10^{-6})^{-3/4} \times (9 \times 10^{-2})^{-3/4}$$

$$= (3)^{6 \times \frac{-3}{4}} \times (10)^{-6 \times \frac{-3}{4}} \times (3)^{2 \times \frac{-3}{4}} \times (10)^{-2 \times \frac{-3}{4}}$$

$$= (3)^{-\frac{9}{2}} \times (10)^{\frac{9}{2}} \times (3)^{-\frac{3}{2}} \times (10)^{\frac{3}{2}}$$

$$= (3)^{-\frac{12}{2}} \times 10^{\frac{12}{2}}$$

$$= (3)^{-6} \times (10)^{6}$$

$$= \frac{10^6}{3^6} \quad (4)$$

(19) If $\sqrt{9^x} = \sqrt[3]{9^2}$, then $x =$ ____

(1) $2/3$ (2) $4/3$ (3) $\frac{1}{3}$ (4) $5/3$

$$\Rightarrow \sqrt{9^x} = \sqrt[3]{9^2}$$

$$9^{\frac{x}{2}} = 9^{2/3}$$

$$x = \frac{2}{3} \times 2 = \frac{4}{3} \quad (2)$$

(20) The length and breadth of a rectangular plot are $5 \times 10^5$ and $4 \times 10^4$ metres respectively. Its area is ____

(1) $9 \times 10^1 \, m^2$ (2) $9 \times 10^9 \, m^2$ (3) $2 \times 10^{10} m^2$ (4) $20 \times 10^{20} \, m^2$

$$\Rightarrow \text{Area} = 5 \times 10^5 \times 4 \times 10^4 \, m^2$$

$$= 20 \times 10^9 \, m^2$$

$$= 2 \times 10^{10} \, m^2 \quad (3)$$