Model Questions / Number Systems – Chapter 1

Answer the following:

1. Find 5 rational numbers between 1 and 2.

Solution:

We can write 1 in the form of rational numbers as $1 = \frac{10}{10}$ & $2 = \frac{20}{10}$.

5 rational numbers between 1 and 2 are $\frac{11}{10}, \frac{12}{10}, \frac{13}{10}, \frac{14}{10}, \frac{15}{10}$.

2. Find the decimal expansions of the following:

a) $\frac{10}{3}$

b) $\frac{7}{8}$

c) $\frac{1}{7}$

Solution:

a) $\frac{10}{3}$ = 3.3333--------

It has a nonterminating, recurring decimal expansion.

b) $\frac{7}{8}$ = 0.875

It has a terminating decimal expansion.

c) $\frac{1}{7}$ = 0.142857------------

It has a nonterminating, recurring decimal expansion.

3. Show that 2.18456 is a rational number.

Solution:

We have 2.18456 = $\frac{218456}{100000}$ and hence is a rational number.

4. Multiply $3\sqrt{2}$ by $5\sqrt{2}$

Solution:

$3\sqrt{2} \times 5\sqrt{2} = 3 \times 5 \times \sqrt{2} \times \sqrt{2} = 15 \times 2 = 30$

5. Add $3\sqrt{2} + 5\sqrt{3}$ and $\sqrt{2} - 4\sqrt{3}$

Solution:

$3\sqrt{2} + 5\sqrt{3} + \sqrt{2} - 4\sqrt{3} = 3\sqrt{2} + \sqrt{2} + 5\sqrt{3} - 4\sqrt{3} = 4\sqrt{2} + \sqrt{3}$

6. Divide $8\sqrt{15}$ by $2\sqrt{3}$

Solution:

$\frac{8\sqrt{15}}{2\sqrt{3}} = \frac{8\sqrt{3} \times \sqrt{5}}{2\sqrt{3}} = 4\sqrt{5}$

7. Simplify $(3 + \sqrt{3})(3 - \sqrt{3})$

Solution:

$(3 + \sqrt{3})(3 - \sqrt{3}) = 3^2 - (\sqrt{3})^2 = 9 - 3 = 6$

8. Rationalise the denominator $\frac{1}{\sqrt{5}}$

Solution:

$\frac{1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

9. Find

a) $36^{\frac{1}{2}}$

b) $8^{\frac{2}{3}}$

Solution:

a) $36^{\frac{1}{2}} = (6^2)^{\frac{1}{2}} = 6$

b) $8^{\frac{2}{3}} = (2^3)^{\frac{2}{3}} = 2^2 = 4$

10. Simplify:

a) $2^{\frac{2}{3}} . 2^{\frac{1}{3}}$

b) $18^{\frac{1}{2}} . 2^{\frac{1}{2}}$

Solution:

a) $2^{\frac{2}{3}} 2^{\frac{1}{3}} = 2^{\frac{2}{3} + \frac{1}{3}} = 2^{\frac{3}{3}} = 2$

b) $18^{\frac{1}{2}} . 2^{\frac{1}{2}} = (18 \times 2)^{\frac{1}{2}} = 36^{\frac{1}{2}} = (6^2)^{\frac{1}{2}} = 6.$