

# IX Test-4

Max. time : 45min

③ 1) Prove that  $\sqrt{x^{-1} \cdot y} \times \sqrt{y^{-1} \cdot z} \cdot \sqrt{z^{-1} \cdot x} = 1$

③ 2) Prove that  $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \times \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \times \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} = 1$

③ 3) Simplify:  $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

③ 4) Evaluate:  $\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$ , given that  $\sqrt{15} = 3.87$

③ 5) Divide  $f(y) = 3y^4 - 8y^3 - y^2 - 5y - 5$  by  $(y - 3)$  and find the quotient and the remainder.

③ 6) Locate  $\sqrt{4.7}$  on the number line.

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### IX Test-4 (Solutions)

$$1) \text{LHS, } \sqrt{x^{-1}y} \times \sqrt{y^{-1}z} \times \sqrt{z^{-1}x}$$

$$= \sqrt{\frac{y}{x}} \times \sqrt{\frac{z}{y}} \times \sqrt{\frac{x}{z}}$$

$$= \sqrt{\frac{y}{x} \times \frac{z}{y} \times \frac{x}{z}} = \sqrt{1}, \text{RHS}$$

$$2) \text{LHS, } \left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \cdot \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \cdot \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}}$$

$$= \frac{x^{\frac{a}{ab}}}{x^{\frac{b}{ab}}} \cdot \frac{x^{\frac{b}{bc}}}{x^{\frac{c}{bc}}} \cdot \frac{x^{\frac{c}{ca}}}{x^{\frac{a}{ca}}} = \frac{x^{\frac{1}{b}} \cdot x^{\frac{1}{c}} \cdot x^{\frac{1}{a}}}{x^{\frac{1}{a}} \cdot x^{\frac{1}{b}} \cdot x^{\frac{1}{c}}} = 1, \text{RHS}$$

$$3) \sqrt[4]{81} - 8 \sqrt[3]{216} + 15 \sqrt[5]{32} + \sqrt{225}$$

$$= 3^{4 \times \frac{1}{4}} - 8 \times 6^{3 \times \frac{1}{3}} + 15 \times 2^{5 \times \frac{1}{5}} + 15$$

$$= 3 - 8 \times 6 + 15 \times 2 + 15 = 3 - 48 + 30 + 15$$

$$= 48 - 48 = 0$$

$$4) \frac{(\sqrt{5} + \sqrt{3})^2}{(\sqrt{5} - \sqrt{3})(\sqrt{5} + \sqrt{3})} = \frac{5 + 3 + 2\sqrt{15}}{(\sqrt{5})^2 - (\sqrt{3})^2} = \frac{8 + 2\sqrt{15}}{5 - 3} = \frac{2(4 + \sqrt{15})}{2} = 4 + \sqrt{15}$$

$$= 4 + 3.87 = 7.87$$

5) On dividing  $f(y)$  by  $y-3$ ,

$$\begin{array}{r} 3y^3 + y^2 + 2y + 1 \\ y-3 \overline{) 3y^4 - 8y^3 - y^2 - 5y - 5} \\ \underline{(-) 3y^4 + 9y^3} \phantom{- 5y - 5} \\ \phantom{3y^4} - 7y^3 - y^2 - 5y - 5 \end{array}$$

quotient =  $3y^3 + y^2 + 2y + 1$  //  
 remainder =  $-2$  //

$$\begin{array}{r} y^3 - y^2 - 5y - 5 \\ (-) y^3 + 3y^2 \phantom{- 5y - 5} \\ \underline{(-) 2y^2 - 5y - 5} \end{array}$$

$$\begin{array}{r} 2y^2 - 5y - 5 \\ (-) 2y^2 - 6y \phantom{- 5} \\ \underline{(-) y - 5} \end{array}$$

$$\begin{array}{r} y - 5 \\ (-) y + 3 \\ \underline{-2} \end{array}$$

6) Construction

6. Locate  $\sqrt{4.7}$  on the number line.

Ans.

$\therefore F$  represents  $\sqrt{4.7}$  on the no. line.

