

Q(1) Express each of the following decimals in the form $\frac{p}{q}$.

(i) $0.\overline{6}$ (ii) $0.\overline{35}$ (iii) $4.\overline{32}$ (iv) $15.\overline{712}$ (v) $0.\overline{621}$

Q(2) Represent $\sqrt{2}$ and $\sqrt{3}$ on the number line.

Q(3) Represent $\sqrt{5}$ on the number line.

Q(4) Rationalise the denominator.

(i) $\frac{5}{\sqrt{3}-\sqrt{5}}$ (ii) $\frac{2\sqrt{3}-\sqrt{5}}{2\sqrt{2}+3\sqrt{3}}$ (iii) $\frac{7+3\sqrt{5}}{7-3\sqrt{5}}$ (iv) $\frac{6-4\sqrt{2}}{6+4\sqrt{2}}$

Q(5) If a and b are rational number find a and b in each of the following.

(i) $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a+b\sqrt{3}$ (ii) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} = a+b\sqrt{5}$

(iii) $\frac{4+3\sqrt{5}}{4-3\sqrt{5}} = a+b\sqrt{5}$ (iv) $\frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}}$

Q(6) Simplify.

(i) $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}}$ (ii) $\frac{4+\sqrt{5}}{4-\sqrt{5}} + \frac{4-\sqrt{5}}{4+\sqrt{5}}$

Q(7) Prove that

$$\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$$

Q(8) If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ find x^2+y^2 .

Q(9) If $x = 3+\sqrt{8}$, find the value of $x + \frac{1}{x}$, $x^2 + \frac{1}{x^2}$, $x^3 + \frac{1}{x^3}$, $x^4 + \frac{1}{x^4}$.

Q(10) Find the value of $\frac{6}{\sqrt{5}-\sqrt{3}}$, it being given that $\sqrt{3} = 1.732$, $\sqrt{5} = 2.236$.

Q (11) Evaluate

(i) $(64)^{1/3}$ (ii) $(125)^{-1/3}$ (iii) $(27)^{-2/3}$ (iv) $(\frac{64}{25})^{-3/2}$

Q (12) Simplify

(i) $\frac{(25)^{3/2} \times (243)^{3/5}}{(16)^{5/4} \times (8)^{4/3}}$ (ii) $(9)^{3/2} - 3 \times 5^0 - (\frac{1}{81})^{-1/2}$

Q (13) Find the values of x .

(i) $9^{x+2} = 240 + 9^x$ (ii) $3^{x+1} = 27 \times 3^4$ (iii) $5^{x-2} = 1$

(iv) $3(2^x + 1) - 2^{x+2} + 5 = 0$

Q (14) Show that

(i) $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}} = 1$ (ii) $(\frac{3^a}{3^b})^{a+b} (\frac{3^b}{3^c}) (\frac{3^c}{3^a}) = 1$

Q (15) If $2^x = 3^y = 12^z$.

Q (16) Learn the following algebraic identities and write them without taking any help.

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

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

(c) $(x+a)(x+b) = x^2 + (a+b)x + ab$

(d) $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

(e) $(a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$= a^3 + b^3 + 3a^2b + 3ab^2$

(f) $(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

$= a^3 - b^3 - 3a^2b + 3ab^2$

(g) $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

(h) $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

(i) $a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

(j) If $a+b+c = 0$, then $a^3 + b^3 + c^3 = 3abc$