IX Test-3

(2) 1) Write the decimal expansion of (i) rational numbers (ii) irrational numbers.

2) Find the value of $\frac{4}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{2}{(243)^{-\frac{1}{5}}}$

(3)

(3) 3) Simplify $\frac{3^{30}+3^{29}+3^{28}}{3^{31}+3^{30}-3^{29}} + \frac{2^{30}+2^{29}+2^{28}}{2^{31}+2^{30}-2^{29}}$

(3) 4) If $x = 5+2\sqrt{6}$, then show that $\sqrt{x} + \frac{1}{\sqrt{x}} = 2\sqrt{3}$

5) Find the values of a and b if

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

(3) 6) Express $0.6 + 0.\overline{7} + 0.4\overline{7}$ in the form of $\frac{p}{q}$; where p, q are integers and $q \neq 0$

(3) 7) Locate $\sqrt{17}$ on the number line.

Answers

1) (i) The decimal expansion of a rational number is either terminating or non-terminating repeating.

(ii) The decimal expansion of a rational number is non-terminating non-repeating.

2) $\frac{\cdot 4}{6^{3x-\frac{2}{3}}} + \frac{1}{4^{4x-\frac{3}{4}}} + \frac{2}{3^{5x-\frac{1}{5}}}$

$= 4 \times 6^2 + 4^3 + 2 \times 3$

$= 4 \times 36 + 64 + 6 = 144 + 64 + 6 = \underline{214}$

3) $\frac{3^{30}+3^{29}+3^{28}}{3^{31}+3^{30}-3^{29}} = \frac{3^{28}(3^2+3^1+1)}{3^{28}(3^3+3^2-3)} = \frac{9+3+1}{27+9-3} = \frac{13}{33}$

$\frac{2^{30}+2^{29}+2^{28}}{2^{31}+2^{30}-2^{29}} = \frac{2^{28}(2^2+2^1+1)}{2^{28}(2^3+2^2-2)} = \frac{4+2+1}{8+4-2} = \frac{7}{10}$

$\therefore \frac{13^{\times 10}}{33_{\times 10}} + \frac{7^{\times 33}}{10_{\times 33}} = \frac{130+231}{330} = \frac{361}{300}$

4) $x = 5+2\sqrt{6}$

$\frac{1}{x} = \frac{1}{5+2\sqrt{6}} = \frac{5-2\sqrt{6}}{(5+2\sqrt{6})(5-2\sqrt{6})} = \frac{5-2\sqrt{6}}{25-24} = 5-2\sqrt{6}$

$\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^2 = x+\frac{1}{x}+2$

$= 5+2\sqrt{6}+5-2\sqrt{6}+2 = 12$

$\therefore \sqrt{x}+\frac{1}{\sqrt{x}} = \sqrt{12} = 2\sqrt{3}$

$12 = 2 \times 2 \times 3$

5) $\frac{7+3\sqrt{5}}{3+\sqrt{5}} = \frac{(7+3\sqrt{5})(3-\sqrt{5})}{3^2-(\sqrt{5})^2} = \frac{21-7\sqrt{5}+9\sqrt{5}-15}{9-5}$

$= \frac{6+2\sqrt{5}}{4}$

$\frac{7-3\sqrt{5}}{3-\sqrt{5}} = \frac{(7-3\sqrt{5})(3+\sqrt{5})}{3^2-(\sqrt{5})^2} = \frac{21+7\sqrt{5}-9\sqrt{5}-15}{9-5}$

$= \frac{6-2\sqrt{5}}{4}$

$\therefore \frac{6+2\sqrt{5}}{4} - \frac{6-2\sqrt{5}}{4} = \frac{6+2\sqrt{5}-6+2\sqrt{5}}{4} = \frac{4\sqrt{5}}{4} = \sqrt{5}$

$= 0+\sqrt{5}$

On comparing with $a+\sqrt{5}b$, $\boxed{a=0, b=1}$

6) $0.6 = \frac{6}{10}$

Let $x = 0.777\ldots \rightarrow (1)$

$10x = 7.777\ldots \rightarrow (2)$

(2)-(1), $9x = 7$

$x = \frac{7}{9}$

Let $y = 0.47777\ldots$

$10y = 4.7777\ldots$

$100y = 47.7777\ldots$

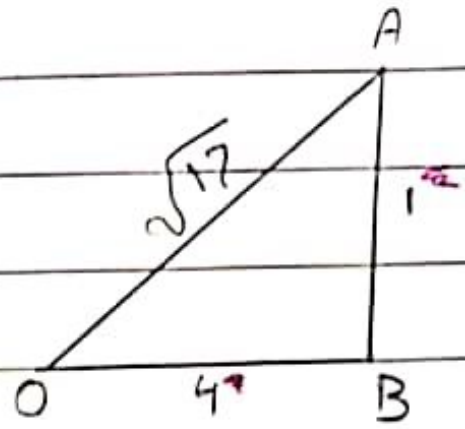
$90y = 43$

$y = \frac{43}{90}$

$\therefore \frac{6}{10} \overset{\times 9}{} + \frac{7}{9} \overset{\times 10}{} + \frac{43}{90} = \frac{54+70+43}{90} = \frac{167}{90}$

7) Construction

1 unit = 2cm



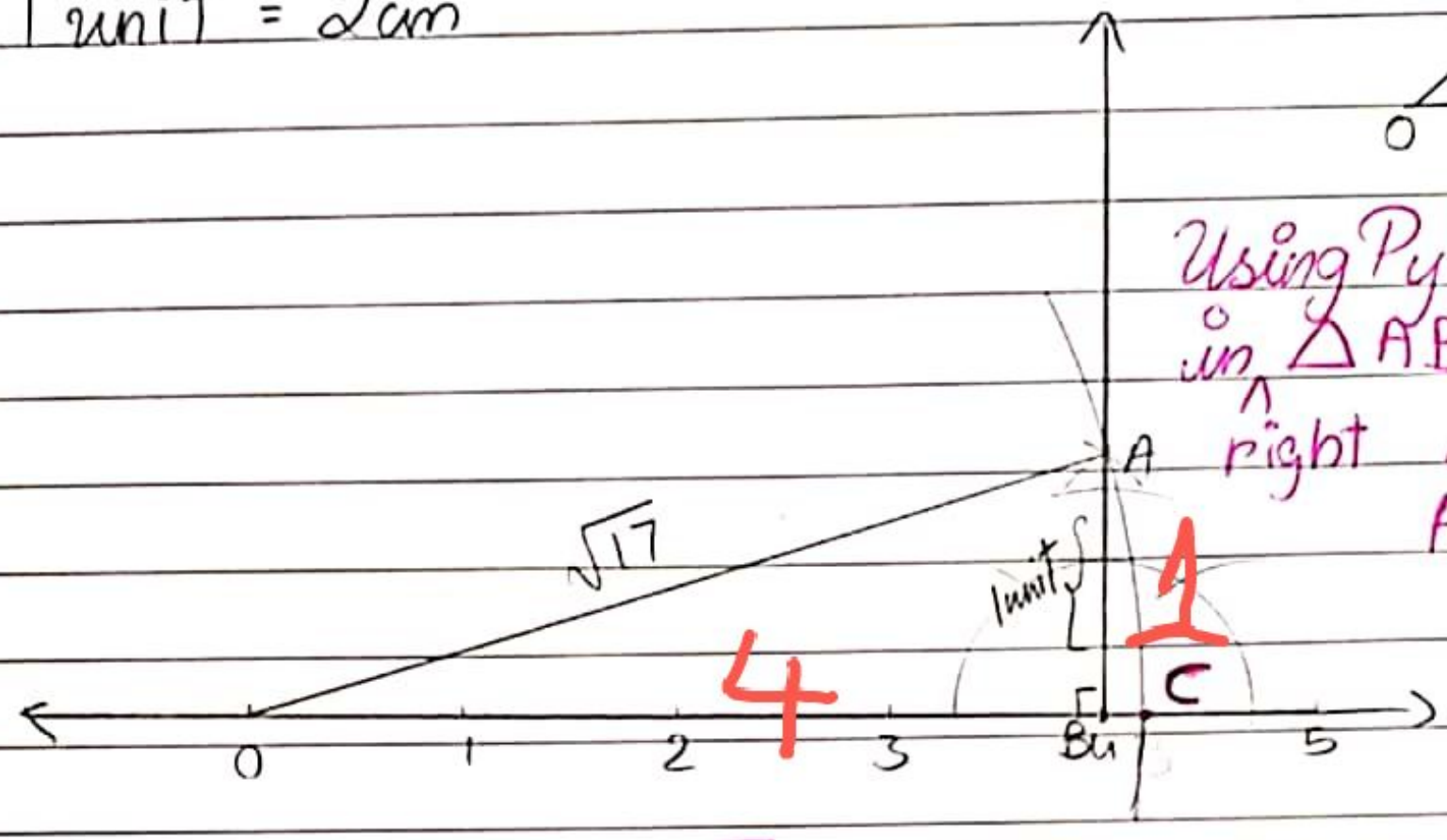
Using Pythegoreus Theorum
in $\triangle AOB$
right

$AO = \sqrt{OB^2 + AB^2}$

$AO = \sqrt{4^2 + 1^2}$

$= \sqrt{16+1}$

$= \sqrt{17}$



∴ C represents $\sqrt{17}$ on the no. line