

# THE SMART STUDY NOTES

## CLASS 9<sup>th</sup> New MATHS

### Chapter 1: Real Numbers

#### Ex# 1.1

**Q1: Identify each of the following as a rational or irrational number.**

(i) 2.353535

Ans. Rational Number

(ii)  $0.6\bar{7}$

Ans. Rational Number

(iii) 2.236067-----

Ans. irrational Number

(iv)  $\sqrt{7}$

Ans. irrational Number

(v)  $e$

Ans. irrational Number

(vi)  $\pi$

Ans. irrational Number

(vii)  $5 + \sqrt{11}$

Ans. irrational Number

(viii)  $\sqrt{3} + \sqrt{13}$

Ans. irrational Number

(ix)  $\frac{15}{4}$

Ans. Rational Number

(x)  $(2 - \sqrt{2})(2 + \sqrt{2})$

Ans.  $= (2 - \sqrt{2})(2 + \sqrt{2})$

$= (2)^2 - (\sqrt{2})^2$

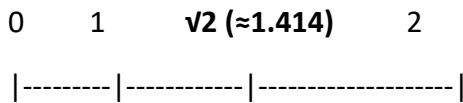
$= 4 - 2 = 2$  so it is rational Number

**Q2: Represent on number line.**

(i)  $\sqrt{2}$

Ans.  $\approx 1.414$

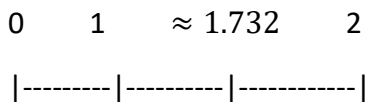
Number Line:



(ii)  $\sqrt{3}$

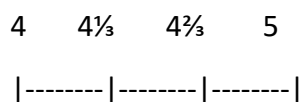
Ans.  $\approx 1.732$

Number Line:



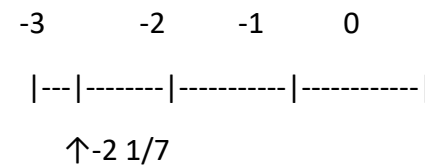
(iii)  $4\frac{1}{3}$

Ans. Number Line:



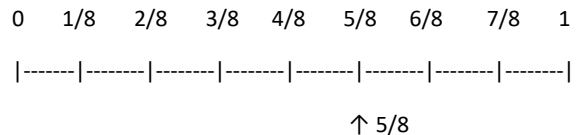
(iv)  $-2\frac{1}{7}$

Ans. Number Line:



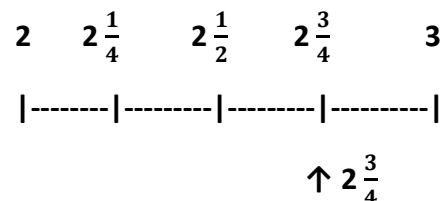
(v)  $\frac{5}{8}$

Ans. Number Line:



(vi)  $2\frac{3}{4}$

Ans. Number Line:



**Q3: Express the following as a rational number**

$\frac{p}{q}$  where p and q are integers and  $q \neq 0$ :

(i)  $0.4^-$

**Solution:**

$$\text{Let } x = 0.4^-$$

$$X = 0.4444\text{-----}$$

Multiplying both sides by 10

$$10X = 10 \times 0.4444\text{----}$$

$$10x = 4.4444\text{-----}$$

$$10x = 4 + 0.4444\text{----}$$

$$\text{Put } 0.4444\text{----} = x$$

$$10x = 4 + x$$

$$10x - x = 4$$

$$9x = 4$$

$$\boxed{X = \frac{4}{9}} \quad \text{Ans}$$

(ii)  $0.37^-$

**Solution:**

$$\text{Let } x = 0.37^-$$

$$X = 0.373737\text{-----}$$

Multiplying both sides by 100

$$100X = 100 \times 0.373737\text{----}$$

$$100x = 37.373737\text{-----}$$

$$100x = 37 + 0.373737\text{----}$$

$$\text{Put } 0.373737\text{----} = x$$

$$100x = 37 + x$$

$$100x - x = 37$$

$$99x = 37$$

$$\boxed{X = \frac{37}{99}} \quad \text{Ans}$$

(i)  $0.21^-$

**Solution:**

$$\text{Let } x = 0.21^-$$

$$X = 0.212121\text{-----}$$

Multiplying both sides by 100

$$100X = 100 \times 0.212121\text{----}$$

$$100x = 21.212121\text{-----}$$

$$100x = 21 + 0.212121\text{----}$$

$$\text{Put } 0.212121\text{----} = x$$

$$100x = 21 + x$$

$$100x - x = 21$$

$$99x = 21$$

$$\boxed{X = \frac{21}{99}} \quad \text{Ans}$$

**Q4: Name the property used in the following:**

(i)  $(a+4) + b = a + (4+b)$

**Ans.** Associative (w.r.t Addition)

(ii)  $\sqrt{2} + \sqrt{3} = \sqrt{3} + \sqrt{2}$

**Ans.** Commutative (w.r.t Addition)

(iii)  $x - x = 0$

**Ans.** Additive Inverse

(iv)  $A(b + c) = ab + ac$

**Ans.** Left Distributive Property over +

(v)  $16 + 0 = 16$

**Ans.** Additive Identity Property

(vi)  $100 \times 1 = 100$

**Ans.** Multiplicative identity

(vii)  $4 \times (5 \times 8) = (4 \times 5) \times 8$

**Ans.** Associative Property w.r.t Multiplication

(viii)  $ab = ba$

**Ans.** Commutative Property w.r.t Multiplication

**Q5: Name the property used:**

(i)  $-3 < -1 \Rightarrow 0 < 2$

**Ans.** We added 3 to both sides:

$$(-3) + 3 < (-1) + 3 \Rightarrow 0 < 2.$$

Addition Property of Order

(ii) **If  $a < b$  then  $\frac{1}{a} > \frac{1}{b}$**

**Ans.** Reciprocal Property of Order

(iii) **If  $a < b$  then  $a + c < b + c$**

**Ans.** Addition Property of Order

(iv) **If  $ac < bc$  and  $c > 0$  then  $a < b$**

**Ans.** Cancellation Property

Multiplication of Order

(v) **If  $ac < bc$  and  $c < 0$  then  $a > b$**

**Ans.** Cancellation Property

Multiplication of Order

(vi) **Either  $a > b$  or  $a = b$  or  $a < b$**

**Ans.** Trichotomy Property

**Q6: Find two rational numbers between:**

(i)  $\frac{1}{3}$  and  $\frac{1}{4}$

**Solution:**

For 1<sup>st</sup> number apply Average Formula

$$= \frac{1}{3} + \frac{1}{4}$$

$$\boxed{= \frac{13}{48}}$$

$$= \frac{4+3}{12} ; = \frac{7}{12}$$

Dividing by 2

$$= \frac{7}{12} \times \frac{1}{2}$$

$$\boxed{= \frac{7}{24}}$$

For 2<sup>nd</sup> Number apply Average Formula

$$= \frac{7}{24} + \frac{1}{4}$$

$$= \frac{28+24}{96} ; = \frac{52}{96} ; = \frac{13}{24}$$

Dividing by 2

$$= \frac{13}{24} \times \frac{1}{2}$$

$$\boxed{= \frac{13}{48}}$$

(ii) 3 and 4

**Solution:**

For 1<sup>st</sup> number apply Average Formula

$$\boxed{= \frac{13}{48}}$$

$$= \frac{3+4}{2} ; = \frac{7}{2}$$

For 2<sup>nd</sup> Number apply Average Formula

$$= \frac{7}{2} + 4$$

$$= \frac{7+8}{2} ; = \frac{15}{2}$$

Dividing by 2

$$= \frac{15}{2} \times \frac{1}{2}$$

$$\boxed{= \frac{15}{4}}$$

(iii)  $\frac{3}{5}$  and  $\frac{4}{5}$

**Solution:**

For 1<sup>st</sup> number apply Average Formula

$$= \frac{3}{5} + \frac{4}{5}$$

$$= \frac{3+4}{5} ; = \frac{7}{5}$$

Dividing by 2

$$= \frac{7}{5} \times \frac{1}{2}$$

$$\boxed{= \frac{7}{10}}$$

For 2<sup>nd</sup> Number apply Average Formula

$$= \frac{7}{10} + \frac{4}{5}$$

$$= \frac{35+40}{50} ; = \frac{75}{50} ; = \frac{15}{10}$$

Dividing by 2

$$= \frac{15}{10} \times \frac{1}{2}$$

$$\boxed{= \frac{15}{20}}$$