THE SMART STUDY NOTES
CLASS 9th 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^{-}
Ans. Rational Number
(iii) 2.236067-------
Ans. irrational Number
(iv) $\sqrt{7}$
Ans. irrational Number
(v) e
Ans. irrational Number
(vi) π
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. ≈ 1.414

Number Line:

0 1 **√2 (≈1.414)** 2

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(ii) $\sqrt{3}$

Ans. ≈ 1.732

Number Line:

0 1 ≈ 1.732 2

|---------|----------|----------|

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

Ans. Number Line:

4 4⅓ 4⅔ 5

|--------|--------|--------|

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

Ans. Number Line:

-3 -2 -1 0

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↑-2 1/7

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

Ans. Number Line:

0 1/8 2/8 3/8 4/8 5/8 6/8 7/8 1

|------|-------|-------|-------|-------|-------|-------|-------|

↑ 5/8

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

Ans. Number Line:

2 $2\frac{1}{4}$ $2\frac{1}{2}$ $2\frac{3}{4}$ **3**

|--------|---------|---------|----------|

↑ $2\frac{3}{4}$

Q3: Express the following as a rational number $\frac{p}{q}$ where p and q are integers and $q \neq 0$:

(i) $0.\overline{4}$

Solution:

Let x = $0.\overline{4}$

X = 0.4444------

Multiplying both sides by 10

10X = 10 x 0.4444----

10x = 4.4444-----

10x = 4 + 0.4444----

Put 0.4444---- = x

10x = 4 + x

10x – x = 4

9x = 4

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

(ii) $0.\overline{37}$

Solution:

Let x = $0.\overline{37}$

X = 0.373737------

Multiplying both sides by 100

100X = 100 x 0.373737----

100x = 37.373737-----

100x = 37 + 0.373737----

Put 0.373737---- = x

100x = 37 + x

100x – x = 37

99x = 37

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

(i) $0.\overline{21}$

Solution:

Let x = $0.\overline{21}$

X = 0.212121------

Multiplying both sides by 100

100X = 100 x 0.212121----

100x = 21.212121-----

100x = 21 + 0.212121----

Put 0.212121---- = x

100x = 21 + x

100x – x = 21

99x = 21

$\boxed{X = \frac{21}{99}}$ 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 x 1 = 100

Ans. Multiplicative identity

(vii) 4 x (5 x 8) = (4 x 5) x 8

Ans. Associative Property w.r.t Multiplication

(viii) Ab = ba

Ans. Commutative Property w.r.t Multiplication

Q5: Name the property used:

(i) **$-3<-1 \implies 0<2$**
Ans. We added 3 to both sides:
$(-3)+3<(-1)+3 \implies 0<2$.
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 1st number apply Average Formula

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

$= \frac{13}{48}$ $= \frac{4+3}{12}$; $= \frac{7}{12}$

Dividing by 2

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

$= \frac{7}{24}$

For 2nd Number apply Average Formula

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

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

Dividing by 2

$= \frac{13}{24} \text{x} \frac{1}{2}$

$= \frac{13}{48}$

(ii) 3 and 4

Solution:

For 1st number apply Average Formula

$= \frac{13}{48}$ $= \frac{3+4}{2}$; $= \frac{7}{2}$

For 2nd Number apply Average Formula

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

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

Dividing by 2

$= \frac{15}{2} \text{x} \frac{1}{2}$

$= \frac{15}{4}$

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

Solution:

For 1st number apply Average Formula

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

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

Dividing by 2

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

$= \frac{7}{10}$

For 2nd Number apply Average Formula

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

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

Dividing by 2

$= \frac{15}{10} \text{x} \frac{1}{2}$

$= \frac{15}{20}$