

Chapter # 1

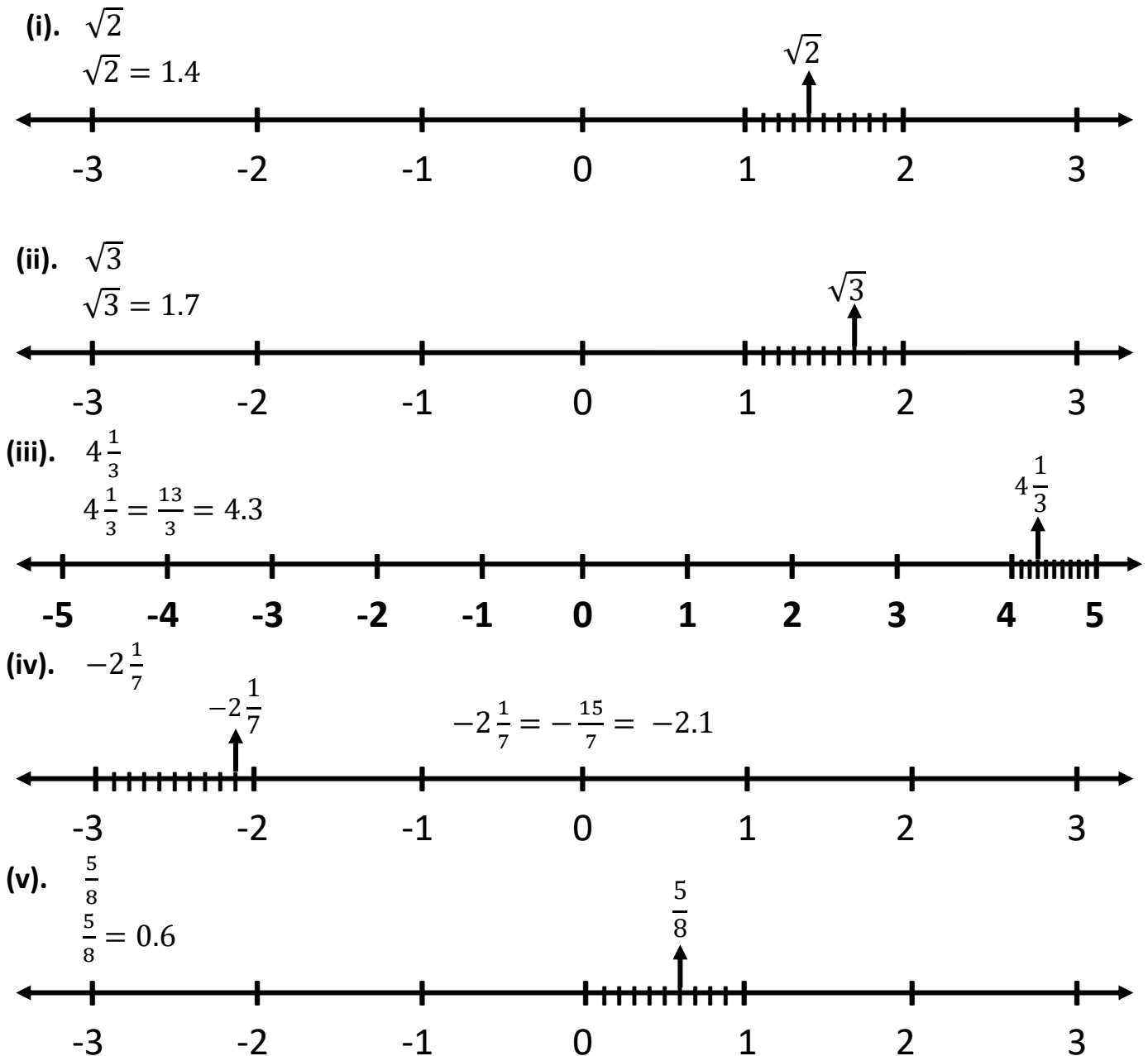
Real Numbers

Exercise # 1.1

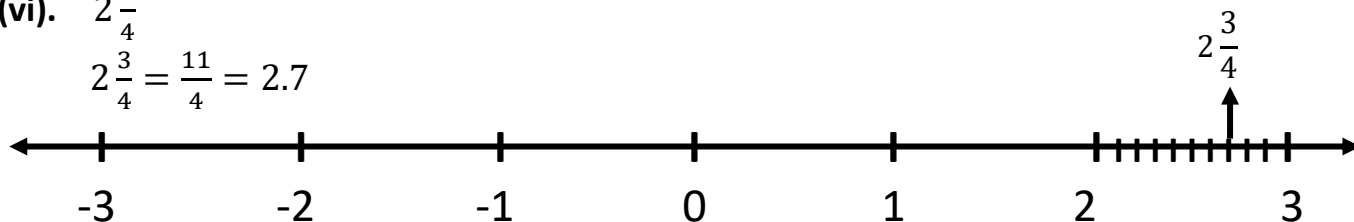
Question # 1: Identify each of the following as a rational or irrational number.

- | | | | |
|---------------------------------|--|-------------------------------------|---|
| (i) 2.353535
Rational | (ii) $0.\bar{6}$
Rational | (iii) 2.236067.....
Irrational | (iv) $\sqrt{7}$
Irrational |
| (v) e
Irrational | (vi) π
Irrational | (vii) $5 + \sqrt{11}$
Irrational | (viii) $\sqrt{3} + \sqrt{13}$
Irrational |
| (ix) $\frac{15}{4}$
Rational | (x) $(2 - \sqrt{2})(2 + \sqrt{2})$
Rational | | |

Question # 2: Represent the following numbers on number line.



(vi). $2\frac{3}{4}$
 $2\frac{3}{4} = \frac{11}{4} = 2.7$



Question # 3: Express the following as rational number $\frac{p}{q}$ where p and q are integers and

$q \neq 0$:

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

Let,

$$x = 0.444 \dots \text{ (A)}$$

Multiply by '10' on both sides,

$$10x = 4.444 \dots \text{ (B)}$$

Subtract eq (A) from eq (B)

$$10x - x = 4.444 \dots - 0.444 \dots$$

$$9x = 4$$

$$x = \frac{4}{9} \text{ (Answer)}$$

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

Let,

$$x = 0.373737 \dots \text{ (A)}$$

Multiply by '100' on both sides,

$$100x = 37.373737 \dots \text{ (B)}$$

Subtract eq (A) from eq (B)

$$100x - x = 37.373737 \dots - 0.373737 \dots$$

$$99x = 37$$

$$x = \frac{37}{99} \text{ (Answer)}$$

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

Let,

$$x = 0.212121 \dots \text{ (A)}$$

Multiply by '100' on both sides,

$$100x = 21.212121 \dots \text{ (B)}$$

Subtract eq (A) from eq (B)

$$100x - x = 21.212121 \dots - 0.212121 \dots$$

$$99x = 21$$

$$x = \frac{21}{99} \text{ (Answer)}$$

Question # 4: Name the property used in the following:

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

Associative property w.r.t addition

(iii) $x - x = 0$

Additive inverse

(v) $16 + 0 = 16$

Additive identity

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

Associative property w.r.t multiplication

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

Commutative property w.r.t addition

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

Left distributive property

(vi) $100 \times 1 = 100$

Multiplicative identity

(viii) $ab = ba$

Commutative property w.r.t multiplication

Question # 5: Name the property used in the following:

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

Additive property

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

Additive property

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

Reciprocal property

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

Cancellation property

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

(vi) Either $a > b$ or $a = b$ or $a < b$
Trichotomy property

Question # 6: Insert two rational numbers between:

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

$$\begin{aligned} 1^{\text{st}} \text{ rational number} &= \left(\frac{1}{3} + \frac{1}{4}\right) \div 2 \\ &= \left(\frac{4+3}{12}\right) \times \frac{1}{2} \\ &= \frac{7}{12} \times \frac{1}{2} \\ &= \frac{7}{24} \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ rational number} &= \left(\frac{1}{3} + \frac{7}{24}\right) \div 2 \\ &= \left(\frac{8+7}{24}\right) \times \frac{1}{2} \\ &= \frac{15}{24} \times \frac{1}{2} \\ &= \frac{15}{48} \end{aligned}$$

3	3,24
2	1,8
2	1,4
2	1,2
	1,1

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

$$\begin{aligned} 1^{\text{st}} \text{ rational number} &= \left(\frac{3}{5} + \frac{4}{5}\right) \div 2 \\ &= \left(\frac{3+4}{5}\right) \times \frac{1}{2} \\ &= \frac{7}{5} \times \frac{1}{2} \\ &= \frac{7}{10} \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ rational number} &= \left(\frac{3}{5} + \frac{7}{10}\right) \div 2 \\ &= \left(\frac{6+7}{10}\right) \times \frac{1}{2} \\ &= \frac{13}{10} \times \frac{1}{2} \\ &= \frac{13}{20} \end{aligned}$$

2	5, 10
5	5, 5
	1, 1

(ii). 3 and 4

$$\begin{aligned} 1^{\text{st}} \text{ rational number} &= (3 + 4) \div 2 \\ &= (7) \times \frac{1}{2} \\ &= \frac{7}{2} \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ rational number} &= \left(3 + \frac{7}{2}\right) \div 2 \\ &= \left(\frac{6+7}{2}\right) \times \frac{1}{2} \\ &= \frac{13}{2} \times \frac{1}{2} \\ &= \frac{13}{4} \end{aligned}$$