EXERCISE 1.1

Q.1. **Identify each of the following as a rational or irrational number**
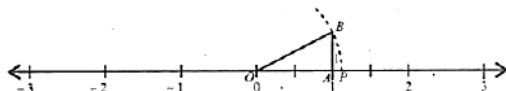
Ans.

(i) 2.353535
Rational number

(ii) 0.6
Rational number

(iii) 2.236067
Irrational number

(iv) $\sqrt{7}$
Irrational number

(v) e
Irrational number

(vi) π
Irrational number

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

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

(ix) $\dfrac{15}{4}$
Rational

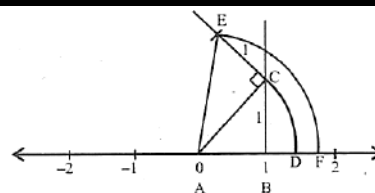**(x)** $\left(2-\sqrt{2}\right)\left(2+\sqrt{2}\right)$
Rational

Q.2. **Represent the following number on number line**

Ans.

(i) $\sqrt{2}$
By using Pythagoras theorem
$\left(\sqrt{2}\right)^2=(1)^2+(1)^2$
$2=1+1$
$2=2$

(ii) $\sqrt{3}$
By Pythagoras theorem
$\left(\sqrt{2}\right)^2=(1)^2+(1)^2$
$2=1+1$
$2=2$
$\left(\sqrt{3}\right)^2=\left(\sqrt{2}\right)^2+(1)^2$
$3=2+1$
$3=3$

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

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

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

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

Q.3. **Express the following as a rational number $\dfrac{p}{q}$ where p and q are integers and $q\neq 0$:**

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

Ans:

Let $x=0.\overline{4}$
$x=0.4444...$ _____(i)
Multiply by 10 on both side
$10x=10\times0.4444...$
$10x=4.4444...$ ____ (ii)
Subtracting (i) and from (ii)
$10x-x=4.4444...-0.4444...$
$9x=4$
$x=\dfrac{4}{9}$ which is a rational number.

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

Ans:

Let $x=0.373737...$ _____(i)
Multiply by 100 on both side
$100\times x=100\times0.373737...$
$100x=37.373737...$ ____(ii)
Subtract (i) from (ii)
$100x-x=37.373737...-0.373737...$
$99x=37$
$x=\dfrac{37}{99}$ is a rational number

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

Ans:

Let $x = 0.212121...$ _____(i)

Multiply by 100 on both side

$100 \times x = 100 \times 0.212121...$

$100x = 21.212121...$ _____(ii)

Subtract (i) by (ii)

$100x - x = 21.212121... - 0.212121...$

$99x = 21$

$x = \dfrac{21}{99}$

Q.4. **Name the property used in the following:**

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

Ans: Associative property w.r.t addition

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

Ans: Commutative property w.r.t addition

(iii) $x - x = 0$

Ans: Additive inverse property

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

Ans: Distributive property over addition

(v) $16 + 0 = 16$

Ans: Additive identity property w.r.t addition

(vi) $100 \times 1 = 100$

Ans: Identity property w.r.t multiplication

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

Ans: Associative property w.r.t multiplicative

(viii) $ab = ba$

Ans: Commutative property w.r.t multiplicative

Q.5. **Name the property used in the following**

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

Ans: Additive property

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

Ans: Reciprocal property

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

Ans: Additive property

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

Ans: Multiplicative property

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

Ans: Multiplicative property

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

Ans: Trichotomy property

Q.6. **Insert two rational between:**

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

Ans:

1st rational number

$\dfrac{1}{3} + \dfrac{1}{4} = \dfrac{4+3}{12} = \dfrac{7}{12}$

2nd rational number

$\dfrac{7}{24} + \dfrac{1}{4} = \dfrac{7+6}{24} = \dfrac{13}{24}$

To find between value dived by 2

$= \dfrac{7}{12} \div 2$

$= \dfrac{7}{12} \times \dfrac{1}{2} = \dfrac{7}{24}$

Required rational numbers between

$\dfrac{1}{3}$ and $\dfrac{1}{4} = \dfrac{7}{24}, \dfrac{13}{24}$

(ii) **3 and 4**

Ans:

(i) $3 + 4 = 7$

To find between value divide by 2

$= 7 \div 2 = \dfrac{7}{2} = 3.5$

(ii) $\left(\dfrac{7}{2} + 4\right) \div 2$

$= \dfrac{7+8}{2} = \dfrac{15}{2} \times \dfrac{1}{2} = \dfrac{15}{4}$

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

Ans:

(i) $\dfrac{3}{5} + \dfrac{4}{5} = \dfrac{3+4}{5} = \dfrac{7}{5}$

To find between value divide by 2

$= \dfrac{7}{5} \div 2 = \dfrac{7}{5} \times \dfrac{1}{2} = \dfrac{7}{10}$

(ii) $= \dfrac{7}{10} + \dfrac{4}{5}$

$= \dfrac{7+8}{10} = \dfrac{15}{10} = \dfrac{3}{2}$