Exercise 1.1

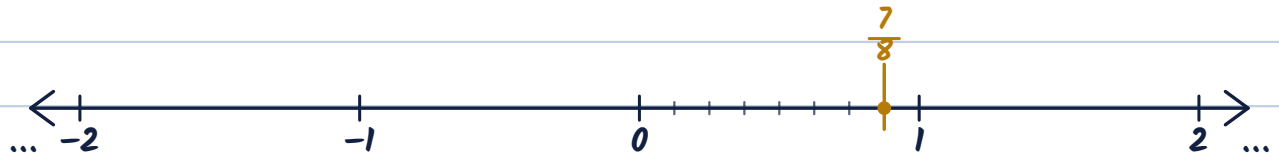
Unit 1 · Real Numbers

1 Represent each number on the number line.

(i) $\frac{7}{8}$

$= 0.875$ (terminating decimal)

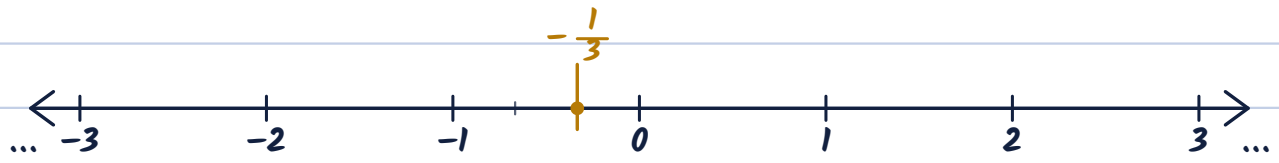
$\therefore \frac{7}{8}$ lies between 0 and 1



(ii) $-\frac{1}{3}$

$= -0.\overline{3}$ (recurring decimal)

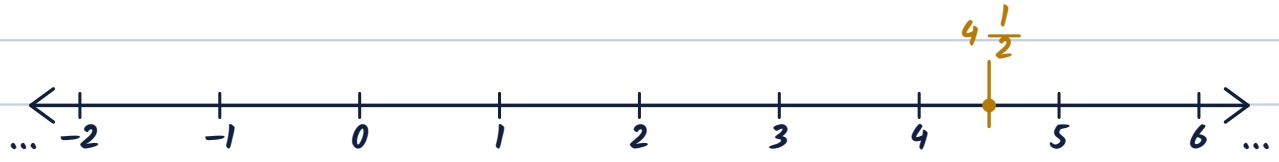
$\therefore -\frac{1}{3}$ lies between -1 and 0



(iii) $4\frac{1}{2}$

$= 4.5$ (terminating decimal)

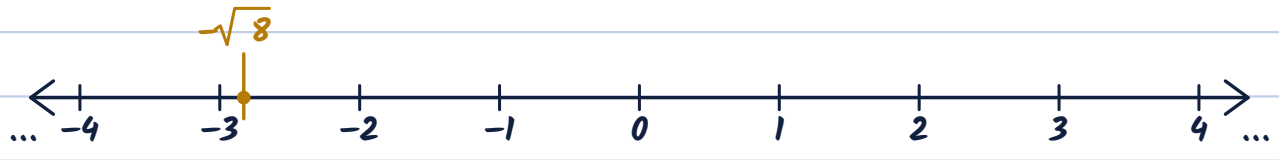
$\therefore 4\frac{1}{2}$ lies between 4 and 5



(iv) $-\sqrt{8}$

$= -2.8284...$ (non-terminating, non-recurring decimal)

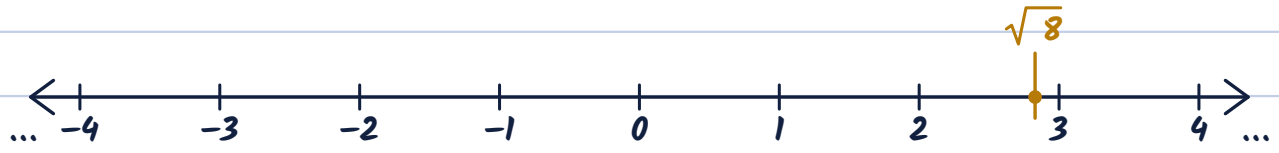
$\therefore -\sqrt{8}$ lies between -3 and -2



(v) $\sqrt{8}$

$= 2.8284...$ (non-terminating, non-recurring decimal)

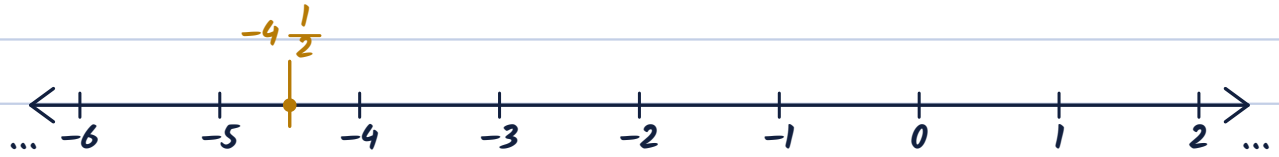
$\therefore \sqrt{8}$ lies between 2 and 3



(vi) $-4\frac{1}{2}$

$= -4.5$ (terminating decimal)

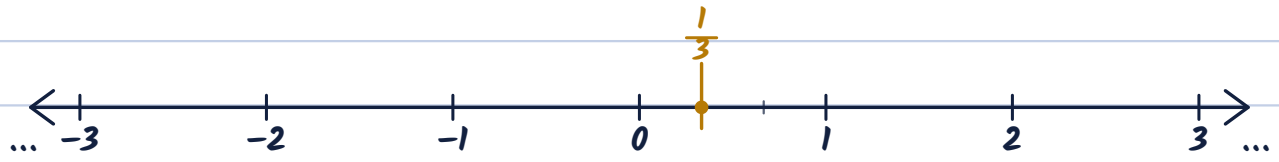
$\therefore -4\frac{1}{2}$ lies between -5 and -4



(vii) $\frac{1}{3}$

$= 0.\overline{3}$ (recurring decimal)

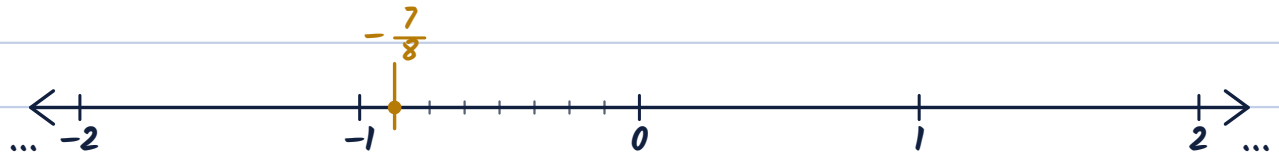
$\therefore \frac{1}{3}$ lies between 0 and 1



(viii) $-\frac{7}{8}$

$= -0.875$ (terminating decimal)

$\therefore -\frac{7}{8}$ lies between -1 and 0



2 Identify the property that justifies each statement.

(i) $1 \times (y - 2) = y - 2$ — Multiplicative identity

(ii) $(0.2)(5) = 1$ i.e. $\frac{1}{5} \times 5 = 1$ — Multiplicative inverse

(iii) $(x + 2) + y = y + (x + 2)$ — Commutative property w.r.t. addition

(iv) $-(3b) + (3b) = 0$ — Additive inverse

(v) $(x + 5) - 1 = x + (5 - 1)$ — Associative property w.r.t. addition

(vi) $-3(2 - y) = -6 + 3y$ — Distributive property of multiplication over subtraction

3 **Represent the following on a number line.**

(i) $x < 0$



Hollow circle: 0 is not included.

(ii) $-3 < x < 3$



Hollow circles: −3 and 3 are not included.

(iii) $x \geq -8$



Filled circle: −8 is included.

(iv) $x > 0$



Hollow circle: 0 is not included.

(v) $x < -3$



Hollow circle: -3 is not included.

(vi) $-4 < x \leq 4$



Hollow circle at -4 (not included), filled circle at 4 (included).

4 Identify the property of equality or inequality of real numbers that justifies each statement.

(i) $9x = 9x$ — *Reflexive property*

(ii) If $x + 2 = y$ and $y = 2x - 3$, then $x + 2 = 2x - 3$ — *Transitive property*

(iii) If $2x + 3 = y$, then $y = 2x + 3$ — *Symmetric property*

(iv) If $3 < 4$, then $-3 > -4$

(multiplying by -1 reverses the sign) — *Multiplicative property*

(v) If $2y + 2w = p$ and $p = 50$, then $2y + 2w = 50$ — *Transitive property*

(vi) If $x + 4 > y + 4$, then $x > y$ — *Cancellation property w.r.t. addition*

(vii) If $2 < 5$ and $5 < 9$, then $2 < 9$ — *Transitive property*

(viii) If $-18 < -16$, then $9 > 8$

Multiply both sides by $-\frac{1}{2}$ (sign reverses):

$(-\frac{1}{2})(-18) > (-\frac{1}{2})(-16)$ *so* $9 > 8$ — *Multiplicative property*