

- 1 a** Yes Fixed
- b** Yes
- c** Yes
- 2 a** No. The sum may be rational or irrational, for instance, $\sqrt{2} + \sqrt{3}$ is irrational; $\sqrt{2} + (3 - \sqrt{2}) = 3$ is rational.
- b** No. The product may be rational or irrational. For instance, $\sqrt{2} \times \sqrt{3} = \sqrt{6}$ is irrational; $\sqrt{2} \times 3\sqrt{2} = 6$ is rational.
- c** No. The quotient may be rational or irrational. For instance $\frac{\sqrt{2}}{\sqrt{3}}$ is irrational; $\frac{3\sqrt{2}}{\sqrt{2}} = 3$ is rational.

3 a $0.45 = \frac{45}{100} = \frac{9}{20}$

b $0.\dot{2}\dot{7} = 0.272727\dots$
 $0.\dot{2}\dot{7} \times 100 = 27.272727\dots$
 $0.\dot{2}\dot{7} \times 99 = 27$
 $\therefore 0.\dot{2}\dot{7} = \frac{27}{99} = \frac{3}{11}$

c $0.12 = \frac{12}{100} = \frac{3}{25}$

d $0.\dot{2}8571\dot{4} = 0.285714285714\dots$
 $0.\dot{2}8571\dot{4} \times 10^6 = 285714.285714\dots$
 $0.\dot{2}8571\dot{4} \times (10^6 - 1) = 285714$
 $\therefore 0.\dot{2}8571\dot{4} = \frac{285714}{999999} = \frac{2}{7}$

e $0.\dot{3}\dot{6} = 0.363636\dots$
 $0.\dot{3}\dot{6} \times 100 = 36.3636\dots$
 $0.\dot{3}\dot{6} \times 99 = 36$
 $\therefore 0.\dot{3}\dot{6} = \frac{36}{99} = \frac{4}{11}$

f $0.\dot{2} = 0.22222\dots$
 $0.\dot{2} \times 10 = 2.2222\dots$
 $0.\dot{2} \times 9 = 2$
 $\therefore 0.\dot{2} = \frac{2}{9}$

4 a $\frac{2}{7} = 7 \overline{)2.000000} \dots$
 $= 0.2857142857\dots$
 $= 0.\dot{2}8571\dot{4}$

b $\frac{5}{11} = 11 \overline{)5.000000} \dots$
 $= 0.454545\dots$
 $= 0.\dot{4}\dot{5}$

c $\frac{7}{20} = 20 \overline{)7.00} \dots$
 $= 0.35$

d $\frac{4}{13} = 13 \overline{)4.000000} \dots$

$$= 0.30769230 \dots$$

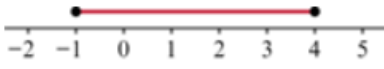
$$= 0.\dot{3}0769\dot{2}$$

$$\text{e } \frac{1}{17} = 17 \overline{)1.0000000000000000} \dots$$

$$= 0.0588235294117647058 \dots$$

$$= 0.\dot{0}58823529411764\dot{7}$$

5 a



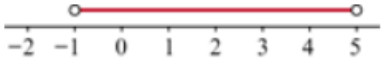
b



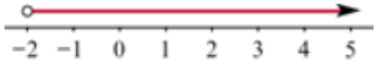
c



d



e



6 a $(-\infty, 3)$

b $[-3, \infty)$

c $(-\infty, -3]$

d $(5, \infty)$

e $[-2, 3)$

f $[-2, 3]$

g $(-2, 3]$

h $(-5, 3)$