

- (1) Complete the following table by making a ✓ in the appropriate column(s) to which each number belongs:

		N	$\mathbb{N}_0$	$\mathbb{Z}$	$\mathbb{Q}$	$\mathbb{Q}'$	$\mathbb{R}$	$\mathbb{R}'$
(a)	3,412 ...					✓	✓	
(b)	$\sqrt[3]{-8} = -2$			✓	✓		✓	
(c)	$\frac{3}{7}$				✓		✓	
(d)	113	✓	✓	✓	✓		✓	
(e)	$\sqrt{\frac{-12}{4}} = \sqrt{-3}$							✓
(f)	π					✓	✓	

- (2) Convert the following to common fractions in simplest form:

(a) $2,3\dot{2}$

$$= 2 + 0,3 + 0,0\dot{2}$$

$$= 2 + \frac{3}{10} + 0,2 \div 10$$

$$= 2 + \frac{3}{10} + \frac{2}{9} \times \frac{1}{10}$$

$$= 2 + \frac{3}{10} + \frac{2}{90}$$

$$= 2 + \frac{3 \times 9}{10 \times 9} + \frac{2}{90}$$

$$= 2 + \frac{27}{90} + \frac{2}{90}$$

$$= 2\frac{29}{90}$$

(b) $0,5\dot{1}$

$$= \frac{51}{99}$$

(3) Between which two integers do the following irrational numbers lie?

(a) $-\sqrt{27}$

(b) $\sqrt[3]{84}$

$$-\sqrt{36} < -\sqrt{27} < -\sqrt{25}$$

$$\sqrt[3]{64} < \sqrt[3]{84} < \sqrt[3]{125}$$

$$-6 < -\sqrt{27} < -5$$

$$4 < \sqrt[3]{84} < 5$$

$$\therefore -\sqrt{27} \text{ lies between } -6 \text{ and } -5.$$

$$\therefore \sqrt[3]{84} \text{ lies between } 4 \text{ and } 5.$$

(4) For which value(s) of x will the following expressions be:

(i) undefined and (ii) non-real?

(a) $\frac{\sqrt{x-2}}{x-3}$

(b) $\frac{5x}{\sqrt{-x}}$

(i) $x - 3 = 0$

(i) $\sqrt{-x} = 0$

$$\therefore x = 3$$

$$-x = 0 \rightarrow \therefore x = 0$$

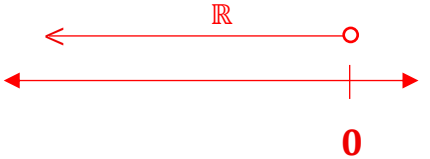
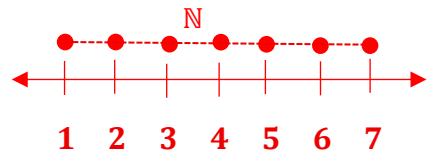
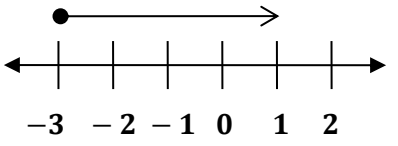
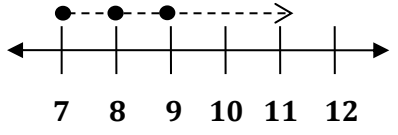
(ii) $x - 2 < 0$

(ii) $-x < 0$

$$\therefore x < 2$$

$$\therefore x > 0$$

(5) Complete the following table:

	Set builder notation:	Interval notation:	Graphic representation:
(a)	$\{x / -2 < x \leq 1; x \in \mathbb{R}\}$	$x \in (-2; 1]$	
(b)	$\{y / y < 0; y \in \mathbb{R}\}$	$y \in (-\infty; 0)$	
(c)	$\{m / m \leq 7; m \in \mathbb{N}\}$	No interval notation	
(d)	$\{x / x \geq -3; x \in \mathbb{R}\}$	$x \in [-3; \infty)$	
(e)	$\{x / x \geq 7; x \in \mathbb{N}\}$ $\{x / x > 6; x \in \mathbb{N}\}$ or $\mathbb{N}_0$ or $\mathbb{Z}$	No interval notation	

6) Given: $P = \sqrt[4]{16x} - 1$. To which of the following numbers system(s) will P belong if: [Number systems: $\mathbb{N}$; $\mathbb{N}_0$; $\mathbb{Z}$; $\mathbb{Q}$; $\mathbb{Q}'$; $\mathbb{R}$ or $\mathbb{R}'$]

(a) $x = \frac{1}{16}$

(b) $x = -1$

(c) $x = 5$

(a) $P = \sqrt[4]{16 \times \frac{1}{16}} - 1 = \sqrt[4]{1} - 1 = 1 - 1 = 0$

P belongs to: $\mathbb{N}_0$; $\mathbb{Z}$; $\mathbb{Q}$; and $\mathbb{R}$

(b) $P = \sqrt[4]{16 \times -1} - 1 = \sqrt[4]{-16} - 1$

P belongs to: $\mathbb{R}'$

(c) $P = \sqrt[4]{80} - 1$

P belongs to: $\mathbb{Q}'$ and $\mathbb{R}$