Worksheet 2015-12ℰA-00001(1)

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

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

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

$P = \sqrt[4]{16x} - 1$

$= \sqrt[4]{16 \times \frac{1}{16}} - 1$

$= \sqrt[4]{1} - 1$

$= 1 - 1 = 0$

$\therefore \mathbb{N}_0; \mathbb{Z}; \mathbb{Q}; \mathbb{R}$

(b) $x = -1$

$P = \sqrt[4]{16x} - 1$

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

$= \sqrt[4]{-16} - 1$

$\therefore \mathbb{R}'$

(c) $x = 5$

$P = \sqrt[4]{16x} - 1$

$= \sqrt[4]{16 \times (5)} - 1$

$= \sqrt[4]{80} - 1$

$\therefore \mathbb{Q}'; \mathbb{R}$

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

(a) $-\sqrt{27}$

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

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

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

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

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

(4) For which value(s) of x will the following expressions be:
(i) undefined and (ii) non-real?

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

(i) $x-3=0$

$x=3$

(ii) $x-3<0$

$x<3$

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

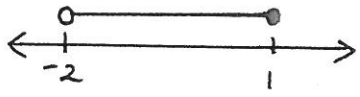
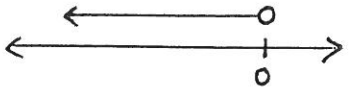
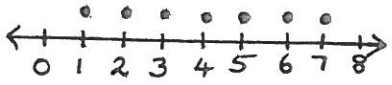
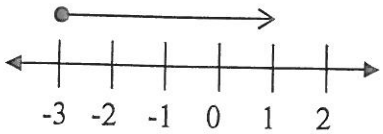
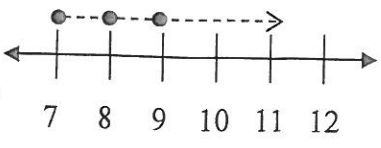
(i) $\sqrt{-x}=0$

$x=0$

(ii) $-x<0$

$x>0$

(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)	$\{x / x \geq 7; x \in \mathbb{N}\}$ or $x \in \mathbb{N}_0$ or $x \in \mathbb{Z}$ or $\{x / x > 6; x \in \mathbb{N}\}$	No Interval notation.