

P12

1. (a), (b), (c) are function, but (d) is not a function. Do vertical line test, then you can easily see it.

2. a) Yes.  $y = x - 5$  is a function. Any linear graph is a function.

d) No it is not a function.

$$y^2 = 4 - x^2$$

$$y = \pm \sqrt{4 - x^2}$$

For example when  $x = 1 \rightarrow y = \pm \sqrt{4 - 1} = \pm \sqrt{3}$

when  $x = 1 \rightarrow$  there are two  $y$  values.

3. a)  $D = \{5, 6, 7, 8, 9\}$

$R = \{5, 6, 7, 8, 9\}$

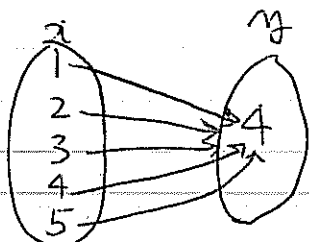
Yes it is.

e)  $D = \{3, 2, 1\}$

$R = \{2, 1, 0, -1, -2\}$

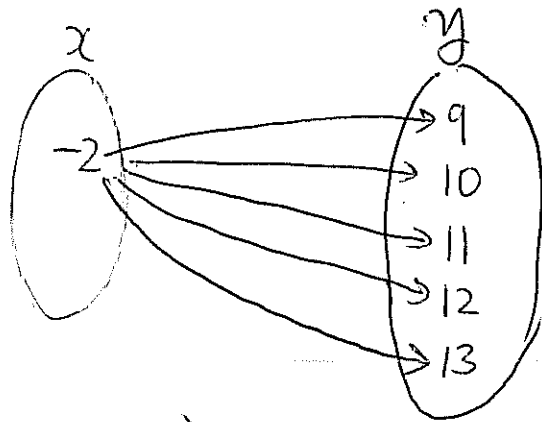
No it is not a function because when  $x = 2$ ,  $y$  can be 1 or -1

4. a) <sup>Yes</sup> ✓ This is a function



P12

4d)



NO this <sup>is</sup> not a function.

5. a)  $D = \{x \in \mathbb{R}\}$  ✓

$R = \{y \in \mathbb{R}\}$  ✓

b)  $D = \{x \in \mathbb{R}\}$  ✓

$R = \{y \in \mathbb{R}, y \geq 0\}$  ✓

c)  $D = \{x \in \mathbb{R}, x \geq 0\}$  ✓

$R = \{y \in \mathbb{R}\}$  ✓

d)  $D = \{x \in \mathbb{R}\}$  ✓

$R = \{y \in \mathbb{R}, y \leq -1\}$  ✓

e)  $D = \{x \in \mathbb{R}, x \neq 3\}$  ✓

$R = \{y \in \mathbb{R}, y \neq 0\}$  ✓

P12

6 a)  $D = \{x \in \mathbb{R}\}$  ✓

$R = \{y \in \mathbb{R}\}$  ✓

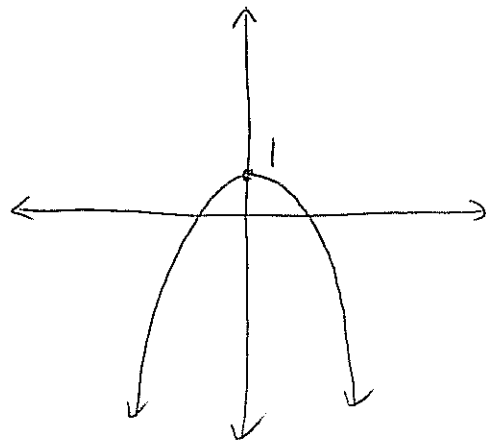
b)  $D = \{x \in \mathbb{R}\}$  ✓

$R = \{y \in \mathbb{R}, y \geq -4\}$  ✓

c)  $y = -3x^2 + 1$

$D = \{x \in \mathbb{R}\}$

$R = \{y \in \mathbb{R}, y \leq 1\}$



d)  $x^2 + y^2 = 9$

$y^2 = 9 - x^2$

$y = \pm \sqrt{9 - x^2}$  (number inside square root can not become zero, so  $x^2 \leq 9 \rightarrow x \leq 3$ )

$D = \{x \in \mathbb{R}, -3 \leq x \leq 3\}$

#15 a)  $y = -x^2 + 5$

b)  $x^2 + y^2 = 9$

\* All the other questions are for students who want to enter Math competition.

