

## Real Function Revision

1. Classify each of the following functions below:

(a)  $x^2 + y^2 = 9$

(g)  $y = \frac{1}{x} + 3$

(m)  $y = 2x$

(b)  $y = \frac{2}{x}$

(h)  $xy = -4$

(n)  $y = 2^{-x}$

(c)  $y = 3^{-x}$

(i)  $x = 3$

(o)  $y = (x + 3)(x - 1)$

(d)  $x + 2y = 4$

(j)  $y = -\sqrt{25 - x^2}$

(p)  $(x - 3)^2 + y^2 = 20$

(e)  $y = x^2 - 2x$

(k)  $y = 4^{-x}$

(f)  $y = \sqrt{16 - x^2}$

(l)  $y = 7$

2. Write down the domain (D) and range (R) of question 1 for:

(a), (d), (g), (i), (j), (h)

3. Determine whether the function  $y = x^3 - 2x$  is odd, even or neither. Show working.

4. Sketch the region, of which the following inequalities hold simultaneously:

$$y \leq \sqrt{9 - x^2}, y \geq 0 \text{ and } x < 1$$

5. If  $f(x) = x^3 - 2x$ , find:

(i)  $f(2)$

(ii)  $f(-1)$

6. Sketch the graph:

$$f(x) = \begin{cases} 2x, & x \geq 1 \\ x^2 - 3, & x < 1 \end{cases}$$

7. Sketch the graph:

$$f(x) = \begin{cases} 3, & x > 3 \\ x^2, & 1 \leq x \leq 3 \\ 2 - x, & x < 1 \end{cases}$$