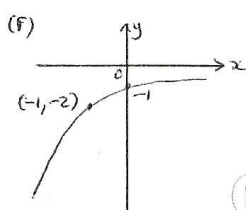
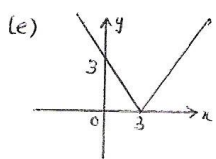
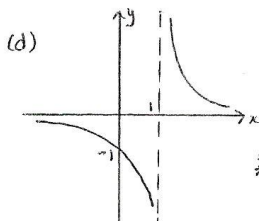
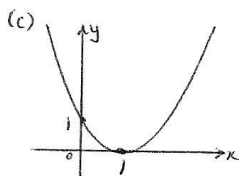
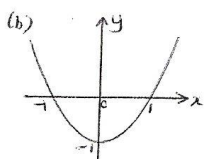
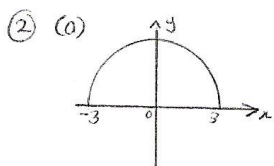


Real Functions Assignment Solutions

① (a) R (b) R (c) F (d) F



③ (a) D: all real x R: $y \geq 5$ (b) D: $-2 \leq x \leq 2$ R: $-2 \leq y \leq 0$

(c) D: all real x, $x \neq 3$ R: all real y, $y \neq 0$ (d) D: all real x R: all real y

(e) $x-1 \geq 0 \therefore x \geq 1$
D: $x \geq 1$
R: $y \geq 0$

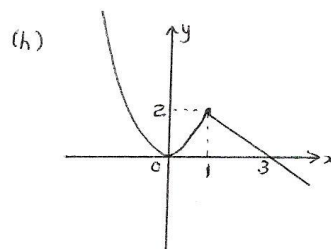
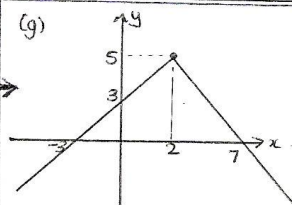
(f) $y = (x+3)(x-1)$
axis of symmetry is $x = -1$
when $x = -1$, $y = (-1+3)(-1-1)$
 $= 2(-2)$
 $= -4$
 \therefore vertex is $(-1, -4)$
D: all real x
R: $y \geq -4$

④ $f(x) = x^5 - x$
 $f(-x) = (-x)^5 - (-x)$
 $= -x^5 + x$
 $= -(x^5 - x)$
 $= -f(x)$

\therefore function is odd.

⑤ $G(-4) = 2(-4)^3 + (-4)$ k4
 $= -128 - 4$
 $= -132$ ②

⑥ $H(-2) = a(-2) + 1 = -2a + 1$
 $H(4) = 4^2 - 5 = 11$
but $H(-2) = H(4)$
 $\therefore -2a + 1 = 11$
 $-2a = 10$
 $a = -5$ ③



⑦ (a) $x^2 + y^2 = 36$ (b) $(x+4)^2 + (y-1)^2 = 64$ ②

⑧ $x^2 - 14x + 49 + y^2 + 4y + 4 = -28 + 49 + 4$
 $(x-7)^2 + (y+2)^2 = 25$ ③
centre $(7, -2)$ and radius 5 write

⑨ (i) $(x+2)^2 + (y-1)^2 = 4$
(ii) $y = 3$ and $y = -3$
(iii) $(x-5)^2 + (y-2)^2 = (x+1)^2 + (y-2)^2$
 $x^2 - 10x + 25 + y^2 - 4y + 4 = x^2 + 2x + 1 + y^2 - 4y + 4$
 $-12x - 12y + 24 = 0$
 $\therefore x + y - 7 = 0$

(iv) $(x-0)^2 + (y-3)^2 = (x-2)^2 + (y+3)^2$
 $x^2 + y^2 - 6y + 9 = x^2 + 4x - 4 + y^2 + 6y + 9$
 $\therefore x^2 = 12y$ ⑥

