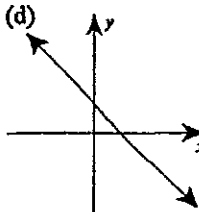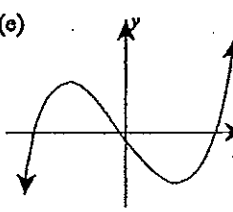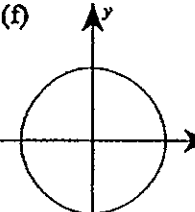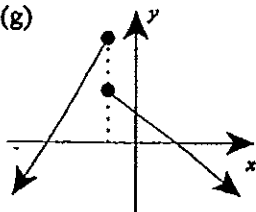1. Write down the domain and range of each relation:

   (a) { (1, 3), (3, 0), (5, 4) }   (b) { (1, 1), (2, 1), (3, 1) }

2. State whether each relation is a FUNCTION or NOT A FUNCTION:

   (a) { (1, 1), (2, 2), (3, 3) }   (b) { (1, 2), (2, 3), (1, 4) }   (c) { {3, 2), (4, 3), (5, 3) }

(d)	(e)	(f)	(g)
(h) $y = 2x^2$	(i) $x = y^2$	(j) $y = 2$	(k) $x = 1$

3.

If $f(x) = 2x^2 - 1$, evaluate

(a) $f(0)$	(b) $f(3)$	(c) $f(-2)$
(d) $3f(1) - [\, f(2)\,]^2$	(e) $f(a)$	(f) $f(x + 1)$

4.

If $g(x) = 2^x + \dfrac{1}{x - 1}$,

(a) evaluate

(i) $g(0)$ (ii) $g(-4)$ as a fraction

(b) For what value of x does $g(x)$ not exist ?

5.

If $f(x) = x^2 + 1$ and $g(x) = 2x - 3$, evaluate

(a) $f[g(0)]$

(b) $g[f(0)]$

simplify   (c) $f[g(x)]$

(d) $g[f(x)]$

6.

Evaluate $h(3)$ if

(a) $h(x) = 5 - x$

(b) $h(x) = \sqrt{25 - x^2}$

(c) $h(x) = 6x$

(d) $h(x) = 6$

(e) $h(x) = |x|$

(f) $h(x) = |2x - 1| - |3 - 5x|$

7.

If $f(x) = 3x - 2$,   solve

(a) $f(x) = 0$

(b) $f(x) = x + 1$

(c) $f(x) < 1$

8.

If $P(x) = x^2 - x - 2$,   solve

(a) $P(x) = 0$

(b) $P(x) = 4$

9.

If $A(x) = 2x^2 + 7x - 4$ and $B(x) = 2x - 1$, solve $A(x) = B(x)$.

10.

If $f(x) = 2^x$, for what value of x does $f(x) = \dfrac{1}{4}$?

11.

If $f(x) = \begin{cases} 1 - x & \text{if} & x < 3 \\ x^2 + 2 & \text{if} & x \geq 3 \end{cases}$ evaluate

(a) $f(-5)$ (b) $f(3)$ (c) $f(5)$

12.

If $f(x) = \begin{cases} x^2 - 1 & \text{if} & x \leq -4 \\ 6 & \text{if} & -4 < x < 0 \\ 5x & \text{if} & x \geq 0 \end{cases}$ evaluate

(a) $f(-6)$ (b) $f(-2)$ (c) $f(-4) + f(2)$ (d) $f(a^2)$

13.

If $f(x) = x^2 + x$, simplify fully $\dfrac{f(x + h) - f(x)}{h}$.

14.

If $g(x) = x^2 - x - 1$, for what value(s) of x does $g(x) = g(-x)$?

15.

If $f(x) = ax + b$, $f(3) = 2$, and $f(4) = 4$, find a and b.

ANSWERS:

1.   (a)   D={1, 3, 5}, R={0, 3, 4}   (b)   D={1, 2, 3}, R={1}

2.   (a)   F   (b)   NF   (c)   F   (d)   F   (e)   F
      (f)   NF   (g)   NF   (h)   F   (i)   NF   (j)   F   (k)   NF

3.
(a) -1 (b)   17   (c)   7   (d) -46
(e) $2a^2 - 1$ (f) $2x^2 + 4x + 1$

4.
(a)   (i)   0   (ii) $-\frac{11}{80}$ (b) $x = 1$

5.
(a)   10   (b) -1 (c) $4x^2 - 12x + 10$ (d) $2x^2 - 1$

6.
(a)   2   (b)   4   (c)   18   (d)   6
(e)   3   (f) -7

7.
(a) $x = \frac{2}{3}$ (b) $x = 1\frac{1}{2}$ (c) $x < 1$

8.
(a) $x = 2, -1$ (b) $x = 3, -2$

9.
$x = -3, \frac{1}{2}$

10.
$x = -2$

11.
(a)   6   (b)   11   (c)   27

12.
(a)   35   (b)   6   (c)   25   (d) $5a^2$

13.
$2x + h + 1$

14.
$x = 0$

15.
$a = 2, \; b = -4$