1 $x + y^2 = 1$

+5

(a) no; +0.5 the input $x = 0$ yields two outputs, $y = \pm 1$. +2

(b) yes; +0.5 For each y-value, $x = 1 - y^2$ is the unique output. +2

2 (a) $f(-2) = 6 + (-2)^2 = 10$ +1

+8

(b) $f(1) = 6 + (1)^2 = 7$ +1

(c) i) $6 + x^2 = 3$

$x^2 = -3$

none

ii) $|x - 5| = 3$

$x - 5 = 3$ or $-x + 5 = 3$

$x = 8$

$-x = -2$

$x = 2$

$x = 8, \quad x = 2$ +3

(d) $f(x) = 15$:

i) $6 + x^2 = 15$

$x^2 = 9$

$x = \pm 3$

but $x = 3$ not a sol.

$x = -3$ is.

ii) $|x - 5| = 15$

$x - 5 = 15$ or $-x + 5 = 15$

$x = 20$ or $-x = 10$

$x = -10$

$x = 20$ is a sol.

$x = -10$ is not a sol.

+3

$x = -3, 20$

(3) R = rate of growth

(+5) N = size of pop.

$$R = kN$$ +3

$$500 = k \cdot 12000$$

$$k = \frac{500}{12000} = \frac{5}{120} \approx 0.042$$ +2

$$R = 0.042N.$$

(4) P = pressure

V = volume

T = temperature.

$$PV = k \cdot T$$ +3

Find k: $1 \cdot 30 = k \cdot 300$

$$\frac{30}{300} = k$$

$$k = \frac{1}{10} = 0.1$$

then $kT = PV$

$$0.1(T) = 20 \cdot 25$$

$$T = \frac{20 \cdot 25}{0.1} = 5000\ ^\circ C$$ (+2)