Ex 1

$f(-2) = -3$, $f(-1) = -3$

(a) - Not one-to-one, because exist of $(-2, -3)$ and $(-1, -3)$.
- Onto Y. The range of f is Y.
- Not bijection. The function is not one-to-one function.
- f is function as every element of X appears exactly once on domain of f.

(b) f is not a function as domain of f, $\{-2, 1, 2\}$ does not equal to X.

(c) f is not a function from X to Y as $(-3, -1)$ and $(-3, 0)$ but $-1 \neq 0$

Ex 2

(a) $f(x) = 4x + 2$, $x \in R$

$y = 4x + 2$

$x = \frac{y-2}{4}$

$f^{-1}(x) = \frac{x-2}{4}$, $x \in R$

(b) $f(x) = 3 + \frac{1}{x}$, $x \in R$

$f(0) = 3 + \frac{1}{0}$

undefined

$\therefore f^{-1}(x)$ does not exists as $f(x)$ is not a one-to-one function.

Ex 3

(a) $f \circ f = (n^2)^2$

$= n^4$

(b) $g \circ g = 2^{(2^n)}$

(c) $f \circ g = (2^n)^2$

$= 2^{2n}$

(d) $g \circ f = 2^{n^2}$