Example 1

A. $\because x+2 \geqslant 0$

$\therefore x \geqslant -2$

B. $\because x^2 - x \neq 0$

$x(x-1) \neq 0$

$\therefore x \neq 0,\ x \neq 1$

Example 2

A. $\because f(-x) = (-x)^5 + (-x)$

$= -x^5 - x$

$= -(x^5 + x)$

$= -f(x)$

$\therefore f(x)$ is odd (奇).

B. $\because g(-x) = 1 - (-x)^4$

$= 1 - x^4$

$= g(x)$

$\therefore g(x)$ is even (偶).

C. $h(-x) = 2(-x) - (-x)^2$

$= -2x - x^2$

$\because h(-x) \neq h(x)$ and $h(-x) \neq -h(x)$

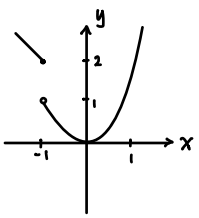
$\therefore h(x)$ is neither odd nor even (非奇非偶).

Example 3

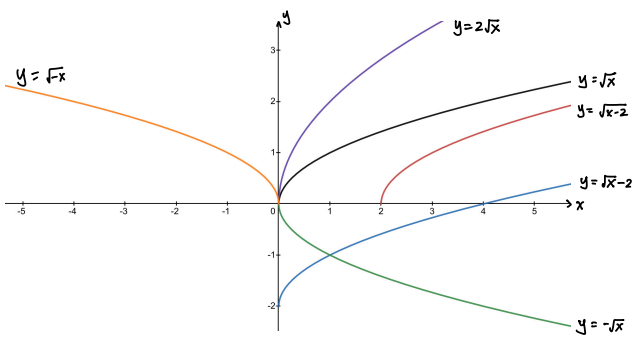
$f(-2) = 1 - (-2) = 3$

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

$f(0) = 0^2 = 0$



Example 4



Example 5

A. $(f \circ g)(x) = f(g(x)) = f(x-3) = (x-3)^2$

$(g \circ f)(x) = g(f(x)) = g(x^2) = x^2 - 3$

B. $(f \circ g)(x) = f(g(x)) = f(\sqrt{2-x}) = \sqrt{\sqrt{2-x}} = \sqrt[4]{2-x}$

$(g \circ f)(x) = g(f(x)) = g(\sqrt{x}) = \sqrt{2 - \sqrt{x}}$

$(f \circ f)(x) = f(f(x)) = f(\sqrt{x}) = \sqrt{\sqrt{x}} = \sqrt[4]{x}$

$(g \circ g)(x) = g(g(x)) = g(\sqrt{2-x}) = \sqrt{2 - \sqrt{2-x}}$

Example 6

A. $f(x) = x^3 + 2$

$y = x^3 + 2$

$x = y^3 + 2$

$y^3 = x - 2$

$y = \sqrt[3]{x-2}$

$\therefore f^{-1}(x) = \sqrt[3]{x-2}$

B. $f(x) = \sqrt{2x-3}$

$y = \sqrt{2x-3}$

$x = \sqrt{2y-3}$

$x^2 = 2y - 3$

$y = \frac{x^2+3}{2}$

$\therefore f^{-1}(x) = \frac{x^2+3}{2},\ x \geqslant 0$ (check domain and range)