Composition $\left(f \circ g \right)(x) = f\left(g(x) \right)$

__Exp__ $f(x) = \sqrt{x}$ and $g(x) = x^2$

Find   ① $D(f)$, $D(g)$

$D(f) = [0, \infty)$

$D(g) = \mathbb{R} = (-\infty, \infty)$

② $\left(f \circ g \right)(x) = f\left(g(x) \right) = f\left(x^2 \right) = \sqrt{x^2} = |x|$

Domain $= \mathbb{R} = (-\infty, \infty)$ ✓

$R = [0, \infty)$

$g = x^2$

$\mathbb{R}$ $\mathbb{R}$

③ $\left(g \circ f \right)(x) = g\left(f(x) \right) = g\left(\sqrt{x} \right) = \left(\sqrt{x} \right)^2 = x$

$[0, \infty)$ $\mathbb{R}$

Domain $= [0, \infty)$ ✓

$(-2) \notin D$

$f(x) = \sqrt{x}$

$\left(g \circ f \right)(-2) = g\left(f(-2) \right)$