

SELF - EXERCISE 7

① $f \circ g(x)$

$f(g)$

$f(x^2)$

$= 3(x^2) - 1$

$= 3x^2 - 1$

$2 \mid 1 \mid 10$

② $(f \circ f)(x)$

$f(f)$

$f\left(\frac{1}{x}\right)$

$\therefore \frac{1}{\frac{1}{x}} = 1 \div \frac{1}{x}$
 $= 1 \times x = x$

you need to simplify the answer.

③ $f \circ g(x) = g \circ f(x)$

$f(g) = g(f)$

Step 1

$fg(x) = f(x+2)$

$= (x+2)^2$

$= x^2 + 4x + 4$

$f(x+2) = g(x^2)$

$(x+2)^2 = x^2 + 2$

$(x+2)(x+2) = x^2 + 2$

$x^2 + 2x + 2x + 4 = x^2 + 2$

$x^2 + 4x + 4 = x^2 + 2$

$x^2 + 4x + 4 - x^2 - x^2 = 0$

$4x + 2 = 0$

$4x = 2$

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

Step 2

$gf(x) = g(x^2)$

$= x^2 + 2$

Step 3

$fg(x) = gf(x)$

$x^2 + 4x + 4 = x^2 + 2$

$x^2 - x^2 + 4x + 4 - 2 = 0$

$4x + 2 = 0$

$4x = -2$

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

$x = -\frac{1}{2}$

$$(4) f(x) = x^2 + 2$$

$$f^{-1}(x) = x^2 + 2$$

$$y = x^2 + 2 \quad \checkmark$$

$$y - 2 = x^2 \quad \checkmark$$

$$\sqrt{y-2} = x^2 \quad \alpha$$

$$f^{-1}(x) = \sqrt{x-2} \quad \checkmark = (x \notin \mathbb{R} \mid x \leq 0)$$

$$\text{Let } y = x^2 + 2$$

$$x^2 = y - 2$$

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

$$f^{-1}(x) = \sqrt{x-2}$$