

## Exercise 87

For the following exercises, find the composition when  $f(x) = x^2 + 2$  for all  $x \geq 0$  and  $g(x) = \sqrt{x - 2}$ .

$$(f \circ g)(6); \quad (g \circ f)(6)$$

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### Solution

Write  $(f \circ g)(x)$ .

$$\begin{aligned}(f \circ g)(x) &= f(g(x)) \\ &= (\sqrt{x - 2})^2 + 2 \\ &= (x - 2) + 2 \\ &= x\end{aligned}$$

Write  $(g \circ f)(x)$ .

$$\begin{aligned}(g \circ f)(x) &= g(f(x)) \\ &= \sqrt{(x^2 + 2) - 2} \\ &= \sqrt{x^2} \\ &= |x| \\ &= x\end{aligned}$$

Therefore,

$$(f \circ g)(6) = 6 \quad \text{and} \quad (g \circ f)(6) = 6.$$