

Find domain & range

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

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

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

for \sqrt{x}

$$D: \underline{x \geq 0}$$

$$R: \sqrt{x} \geq 0$$

for x^2

$$D: -\infty < x < \infty$$

$$R: 0 \leq x^2$$

Domain for $(\sqrt{x})^2$

$$D: x \geq 0$$

Range for $(\sqrt{x})^2$

$$0 \leq x$$

$$0 \leq \sqrt{x}$$

$$0 \leq (\sqrt{x})^2$$

$$R: 0 \leq (\sqrt{x})^2$$

for \sqrt{x}

$$D: \underline{x \geq 0}$$

$$R: \sqrt{x} \geq 0$$

for x^2

$$D: -\infty < x < \infty$$

$$R: 0 \leq x^2$$

$$\sqrt{x^2}$$

Domain for $\sqrt{x^2}$

$$D: -\infty < x < \infty$$

Range for $\sqrt{x^2}$

$$-\infty < x < \infty \quad R: 0 \leq \sqrt{x^2}$$

$$0 \leq x^2$$

$$0 \leq \sqrt{x^2}$$

$$\sqrt{x^2} = |x|$$

$$(\sqrt{x})^2 = x, \quad x \geq 0$$

$$f(x) = \sqrt{6 - 2x}$$

$$g(x) = \sqrt{x + 5}$$

Let $h(x) = f(g(x))$. Find $D \& R$.

$$f(x) = \sqrt{6 - 2x}$$

$$6 - 2x \geq 0$$

$$3 \geq x : D$$

$$x \leq 3$$

$$-2x \geq -6$$

$$6 - 2x \geq 0$$

$$\sqrt{6 - 2x} \geq 0$$

$$0 \leq \sqrt{6 - 2x} : R$$

$$g(x) = \sqrt{x + 5}$$

$$D: x \geq -5$$

$$x + 5 \geq 0$$

$$\sqrt{x + 5} \geq 0$$

$$R: \sqrt{x + 5} \geq 0$$

$$f(x) = \sqrt{6-2x}$$

$$D: x \leq 3$$

$$R: \sqrt{6-2x} \geq 0$$

$$g(x) = \sqrt{x+5}$$

$$D: x \geq -5$$

$$R: \sqrt{x+5} \geq 0$$

$$h(x) = f(g(x))$$

$$0 \leq \sqrt{x+5} \leq 3$$

Domain of $h(x)$

$$D: -5 \leq x \leq 4$$

$$0 \leq x+5 \leq 9$$

$$-5 \leq x \leq 4$$

$$h(x) = \sqrt{6-2\sqrt{x+5}}$$

$$0 \leq x+5 \leq 9$$

$$0 \leq \sqrt{x+5} \leq 3$$

$$0 \geq -2\sqrt{x+5} \geq -6$$

$$6 \geq 6-2\sqrt{x+5} \geq 0$$

$$\sqrt{6} \geq \sqrt{6-2\sqrt{x+5}} \geq 0$$