

$$8) f(x) = x^3 \quad g(x) = \sqrt[3]{1-x^3}$$

$$\left(\frac{f}{g}\right)(x) = \frac{x^3}{\sqrt[3]{1-x^3}}$$

$$\sqrt[3]{-1} \quad \sqrt[2]{-1}$$

$$1-x^3 \neq 0$$

$$x^3 \neq 1$$

$$x \neq 1$$

$$\text{Domain: } (-\infty, 1) \cup (1, \infty)$$

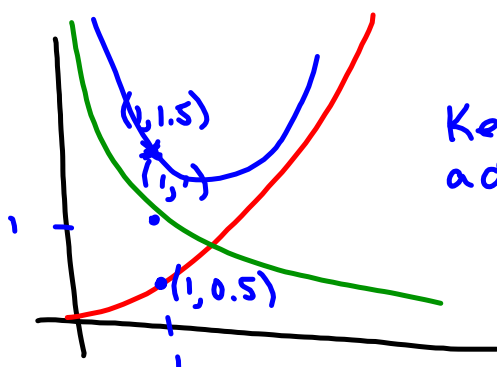
$$\left(\frac{g}{f}\right)(x) = \frac{\sqrt[3]{1-x^3}}{x^3}$$

$$x^3 \neq 0$$

$$x \neq 0$$

$$\text{Domain: } (-\infty, 0) \cup (0, \infty)$$

9) $(f+g)(x)$



Keep x-values
add y-values

f $\sqrt{x-2}$ g $\sqrt{x+4}$

$$\frac{\sqrt{x-2}}{\sqrt{x+4}}$$

$$\begin{aligned} x-2 &\geq 0 \\ x &\geq 2 \end{aligned}$$

$$\begin{aligned} x+4 &> 0 \\ x &> -4 \end{aligned}$$



$$[2, \infty)$$

f(x) = \sqrt{x}

g(x) = $\sin x$

\sqrt{x}
D: $[0, \infty)$

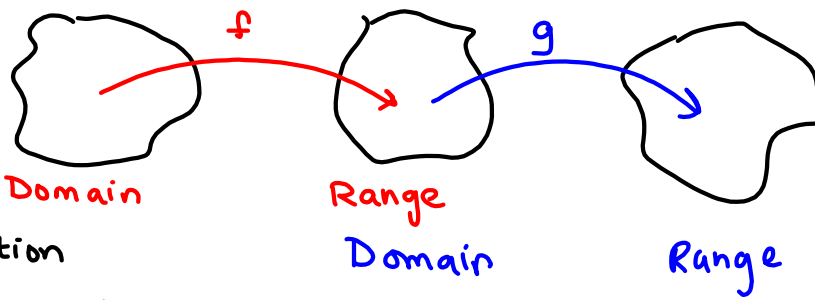
$\sin x$
D: $(-\infty, \infty)$

+ $\sqrt{x} + \sin x$

- $\sqrt{x} - \sin x$

· $(\sqrt{x})(\sin x)$

1.4 Composition of Functions



Notation

$$(f \circ g)(x) = f(g(x))$$

$x \rightarrow g \rightarrow f$

Ex $f(x) = 2x - 1$ $g(x) = 3x$ $h(x) = x^2 + 1$

a) $f(g(x))$

g $3x$
 f $2(3x) - 1$
 $f(g(x)) = 6x - 1$

b) $f(g(-3))$

$3(-3)$
 -9
 $2(-9) - 1$
 $f(g(-3)) = -19$

c) $(g \circ f)(x)$

$2x - 1$
 $3(2x - 1)$
 $(g \circ f)(x) = 6x - 3$

If $f(g(x)) = g(f(x))$
 then f and g are
 inverses of one another

d) $(g \circ h)(24)$

$x^2 + 1$
 $(24)^2 + 1 = 577$
 $3(577) = 1731$
 $(g \circ h)(24) = 1731$

$(g \circ h)(x)$
 $x^2 + 1$
 $3(x^2 + 1)$
 $3x^2 + 3$

$(g \circ h)(x) = 3x^2 + 3$

