

Exercise set (0.2)

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27, 28, 29 (a, b, c, f), 30 (b, c, g), 31, 32, 34, 35, 41,42, 43, 44, 59 (a, b, e, f) p.25-26.

27–28 Find formulas for $f + g$, $f - g$, fg , and f/g , and state the domains of the functions. 27. $f(x) = 2\sqrt{x-1}$, $g(x) = \sqrt{x-1}$
$(f+9)(X) = 2\sqrt{X-1} + \sqrt{X-1} = 3\sqrt{X-1}$
Domain:
$X_{ \geq 0}$
$X \ge I$
$D_{f+g} = [], +\infty)$
$(f-9)(X) = 2\sqrt{X-1} = \sqrt{X-1} = \sqrt{X-1}$
Domain:
$X^{ \geq 0}$
$X \ge I$
$D_{f-g} = []_{,+\infty})$
$(fg)(X) = (2\sqrt{X_1})(\sqrt{X_1}) = 2(X_1) = 2X_2$
Domain:
$D_{fg} = [], +\infty)$

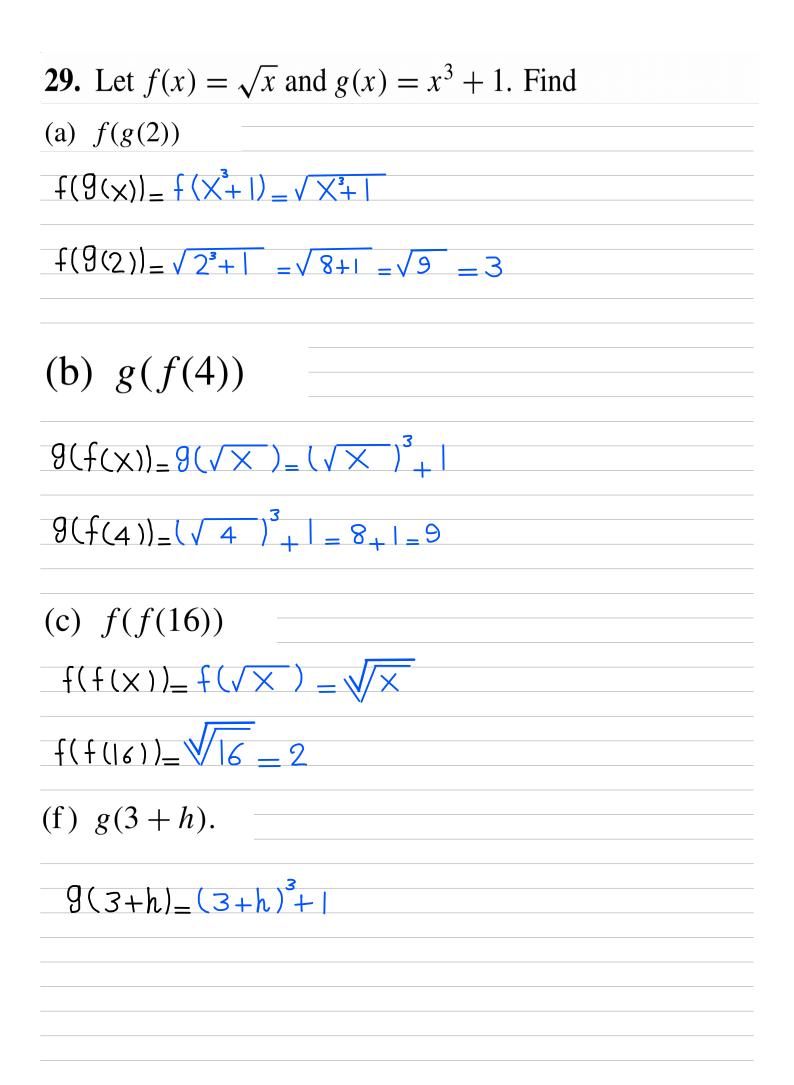
$(f/g)(X) = \frac{2\sqrt{X-1}}{\sqrt{X-1}} = 2$
Domain:
$X_{-} > 0$
$D_{f/g} = []_{,+\infty}) \cap (]_{,+\infty}) = (]_{,+\infty})$

28.
$$f(x) = \frac{x}{1+x^2}, g(x) = \frac{1}{x}$$

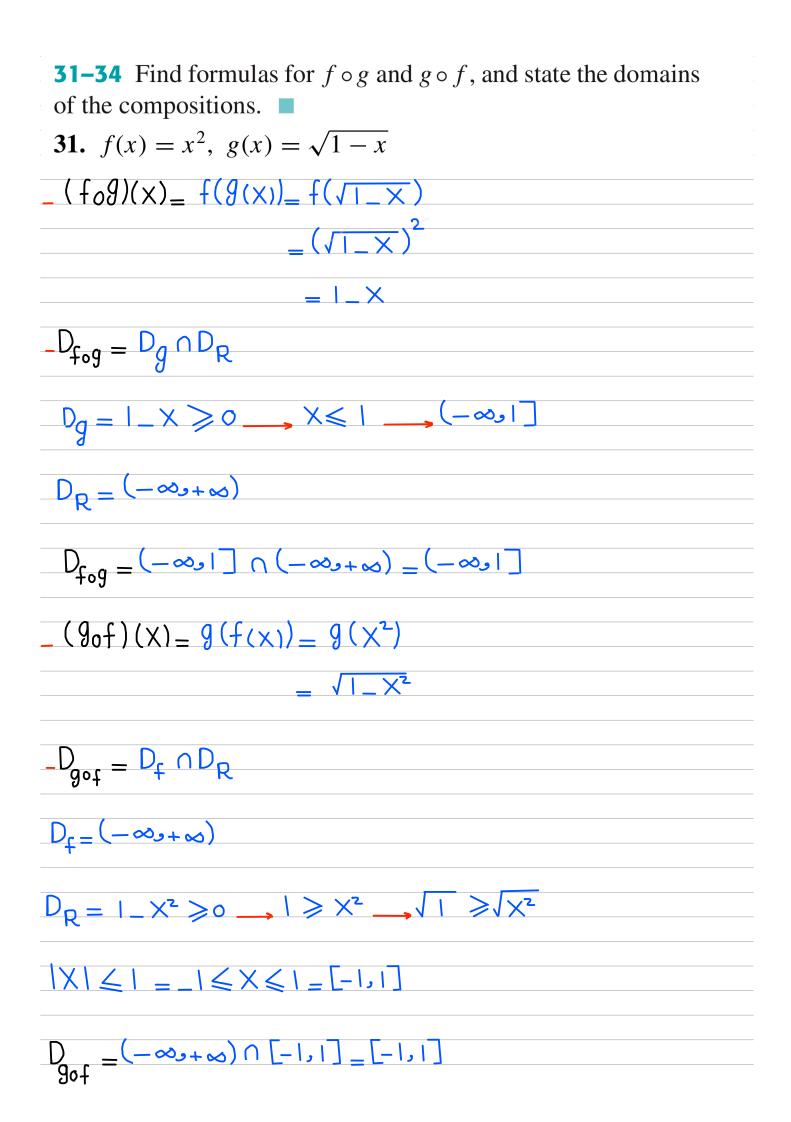
$$= (f+9)(X) = \frac{X}{1+X^2} + \frac{1}{X}$$

$$= \frac{X^2 + (1+X^2)}{X(1+X^2)} = \frac{2X^2 + 1}{X(1+X^2)}$$
Domain:
 $D_f = (-\infty, + \infty)$
 $D_g = (-\infty, 0) \cup (0, + \infty)$
 $D_{g=} (-\infty, 0) \cup (0, + \infty)$
 $= (-\infty, 0) \cup (0, + \infty)$
 $= (-\infty, 0) \cup (0, + \infty)$
 $= (-\infty, 0) \cup (0, + \infty)$
Domain:
 $D_{f=g} = (-\infty, + \infty)$
 $D_{g=} (-\infty, + \infty)$
 $D_{g=} (-\infty, + \infty)$
 $D_{f=g} = (-\infty, + \infty) \cap (-\infty, 0) \cup (0, + \infty)$
 $= (-\infty, 0) \cup (0, + \infty)$

$$\begin{array}{c} (fg)(X) = \underbrace{X}_{1 + X^{2}}, \underbrace{X}_{1} = \underbrace{1}_{1 + X^{2}} \\ \hline Domain: \\ D_{f} = (-\infty, + \infty) \\ D_{g} = (-\infty, + \infty) \\ (0, + \infty) \\ = (-\infty, + \infty) \\ (1 + X^{2}) \\ = \underbrace{(-\infty, + \infty)}_{1 + X^{2}} / \underbrace{1}_{X} \\ = \underbrace{X}_{1 + X^{2}} / \underbrace{1}_{X} \\ = \underbrace{X}_{1 + X^{2}} \\ D_{g} = (-\infty, + \infty) \\ D_{g} = (-\infty, + \infty) \\ (0, + \infty) \\ \end{array}$$

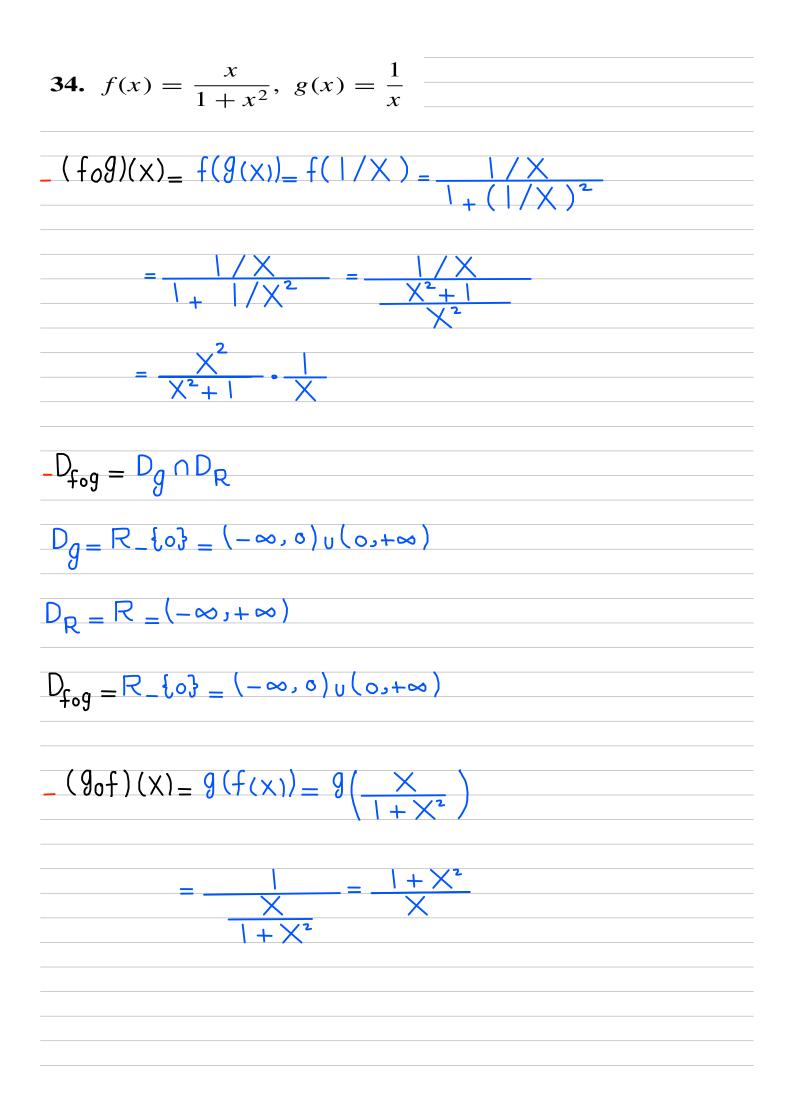


30. Let $g(x) = \sqrt{x}$. Find (b) $g(\sqrt{x}+2)$ $9(\sqrt{x}+2)=\sqrt{\sqrt{x}+2}$ (c) 3g(5x) $33(2X) = 3\sqrt{2X}$ (g) $g(1/\sqrt{x})$ $g(1/\sqrt{X})_{=}$



32. $f(x) = \sqrt{x-3}, g(x) = \sqrt{x^2+3}$ $-(f_0g)(x) = f(g(x)) = f(\sqrt{x^2+3}) = \sqrt{\sqrt{x^2+3}} = 3$ $-D_{f \circ g} = D_{g} \cap D_{R}$ $D_q = (-\infty + \infty)$ $D_{p} = \sqrt{X^{2}+3} = 3 \ge 0 \longrightarrow \sqrt{X^{2}+3} \ge 3$ $(\sqrt{\chi^2 + 3})^2 \geqslant (3)^2 \longrightarrow \chi^2 + 3 \geqslant 9$ $\chi^2 \geq 6$ $\chi^2 \geq \sqrt{6}$ $|X| \ge \sqrt{6}$ $X \ge \sqrt{6}$ or $X \le \sqrt{6}$ $D_{f_{0}q} = (-\infty_{+}\infty) \cap (-\infty_{-}\sqrt{6}] \cup [\sqrt{6}, +\infty)$ $= (-\infty, \sqrt{6}] \cup [\sqrt{6}, +\infty)$ $(9_{of})(X) = g(f(X)) = g(\sqrt{X}_3) = \sqrt{(X_3)^2}_3$ $=\sqrt{X_3_3} = \sqrt{X}$

 $\mathsf{D}^{\mathsf{dot}} = \mathsf{D}^{\mathsf{t}} \cup \mathsf{D}^{\mathsf{K}}$ _X ≥ 3 _[3,+∞) $D^{t} = X^{3} \ge 0$ $D_R = X$ _[0,+∞) >0 D^{got} = 3,+∞)∩[0,+∞)_[3,+∞)



 $-D^{\text{dot}} = D^{\text{t}} \cup D^{\text{K}}$ $\mathsf{D}_{\mathsf{f}} = \mathsf{R} = (-\infty, +\infty)$ $D_{R} = R_{0} = (-\infty, 0)_{U}(0, +\infty)$ $D_{got} = R^{\{o\}} = (-\infty, o) u(o, +\infty)$

35–40 Express f as a composition of two functions; that is, find g and h such that $f = g \circ h$. [Note: Each exercise has more than one solution.] **35.** (a) $f(x) = \sqrt{x+2}$ $g(x) = \sqrt{X}$ h(X) = X + 2 $9 \circ h = 9(h(x)) = 9(X+2) = \sqrt{X+2}$ (b) $f(x) = |x^2 - 3x + 5|$ g(x) = |X| $h(X) = X^{2} - 3X + 5$ $9 \circ h = 9(h(x)) = 9(X^2 - 3X + 5) = |X^2 - 3X + 5|$

41–44 True–False Determine whether the statement is true or false. Explain your answer. ■

41. The domain of f + g is the intersection of the domains of f and g.

42. The domain of $f \circ g$ consists of all values of x in the domain of g for which $g(x) \neq 0$. (\vdash)

domain of fog Consist of all X in the domain of g

for which 9(X) in the domain of f

43. The graph of an even function is symmetric about the y-axis. (\top)

44. The graph of y = f(x + 2) + 3 is obtained by translating the graph of y = f(x) right 2 units and up 3 units. (\vdash)

by translating the graph left 2 units and

UP3 units

