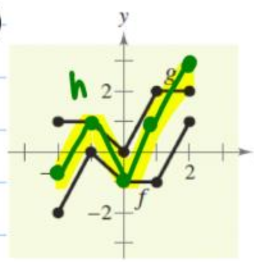
Tuesday, October 17, 2017
6:46 PM

HW 1.8C　　　　　　2, 4, 10, 12, 18, 24, 36, 42, 44, 46

Use the graphs of f and g to graph $h(x) = (f+g)(x)$.

2)



f

x	f(x)
-2	-2
-1	0
0	-1
1	-1
2	1

g

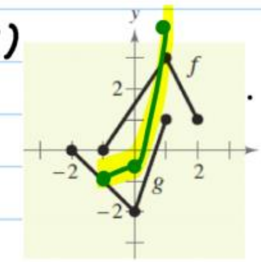
x	g(x)
-2	1
-1	1
0	0
1	2
2	2

h(x) =

x	f(x) + g(x) *
-2	-1
-1	1
0	-1
1	1
2	3

* $(f+g)(x) = f(x) + g(x)$

* 4)



f

x	f(x)
-2	0
-1	-1
0	-2
1	1
2	undef.

g

x	g(x)
-2	undef
-1	0
0	1.5
1	3
2	1

h(x) =

x	f(x) + g(x)
-2	undef.
-1	-1
0	-.5
1	4
2	undef.

Find a) $(f+g)(x)$ b) $(f-g)(x)$ c) $(fg)(x)$
d) $(f/g)(x)$. What is the domain of f/g?

10) $f(x) = \sqrt{x^2-4}$ $\quad g(x) = \dfrac{x^2}{x^2+1}$

a) $(f+g)(x) = \boxed{\sqrt{x^2-4} + \dfrac{x^2}{x^2+1}}$ $\quad$ c) $(fg)(x) = \boxed{\dfrac{x^2\sqrt{x^2-4}}{x^2+1}}$

b) $(f-g)(x) = \boxed{\sqrt{x^2-4} - \dfrac{x^2}{x^2+1}}$

d) $(f/g)(x) = \dfrac{\sqrt{x^2-4}}{\dfrac{x^2}{x^2+1}} = \sqrt{x^2-4} \cdot \dfrac{x^2+1}{x^2} = \boxed{\dfrac{\sqrt{x^2-4}\,(x^2+1)}{x^2}}$

Domain: $x^2 - 4 \geq 0$ * must be pos. under $\sqrt{\ }$

$\sqrt{x^2} \geq \sqrt{4}$

$|x| \geq 2$

$-x \geq 2$; $x \geq 2$

$x \leq -2$ or $x \geq 2$

$(-\infty, -2] \cup [2, \infty)$

* denom ≠ 0

$x^2 + 1 \neq 0$

$x^2 \neq -1$

no # squared gives a neg. (no restriction

* denom ≠ 0

$x^2 \neq 0$

$x \neq 0$

$\boxed{\text{Domain: } (-\infty, -2] \cup [2, \infty)}$

12) $f(x) = \frac{x}{x+1}$ $\quad g(x) = x^3$

a) $(f+g)(x) = \frac{x}{x+1} + x^3 \cdot \frac{(x+1)}{(x+1)} = \frac{x}{x+1} + \frac{x^4+x^3}{x+1} = \boxed{\frac{x^4+x^3+x}{x+1}}$

b) $(f-g)(x) = \frac{x}{x+1} - \frac{x^4+x^3}{x+1} = \boxed{\frac{-x^4-x^3+x}{x+1}}$

c) $(fg)(x) = \frac{x}{x+1} \cdot x^3 = \boxed{\frac{x^4}{x+1}}$

d) $(f/g)(x) = \dfrac{\frac{x}{x+1}}{\frac{x^3}{1}} = \frac{x}{x+1} \cdot \frac{1}{x^3} = \boxed{\frac{1}{x^2(x+1)}}$

$x \neq -1$ $\quad x \neq 0$

Domain: All real numbers except $x \neq -1$ and $x \neq 0$

$\boxed{(-\infty,-1) \cup (-1,0) \cup (0,\infty)}$

Evaluate the function for $f(x) = x^2+1$ and $g(x) = x-4$

18) $(f+g)(t-2) = f(t-2) + g(t-2)$

$= (t-2)^2+1 + (t-2)-4$

$= (t-2)(t-2)+1+t-6 = t^2-4t+4+t-5$

$= \boxed{t^2-3t-1}$

24) $(fg)(5) + f(4) = f(5) \cdot g(5) + f(4)$

$= [(5)^2+1] \cdot [5-4] + (4)^2+1$

$= (26)(1) + 17 = \boxed{43}$

Find a) $f \circ g$ b) $g \circ f$ Find the domain of each

36) $f(x) = \sqrt[3]{x-5}$ $\quad g(x) = x^3+1$ $\}$ $\boxed{\text{Domain: } (-\infty,\infty)}$

a) $f \circ g = \sqrt[3]{x^3+1-5} = \boxed{\sqrt[3]{x^3-4}}$ *

b) $g \circ f = \left(\sqrt[3]{x-5}\right)^3 + 1 = x-5+1 = \boxed{x-4}$ *

$\boxed{\text{Domain: } (-\infty,\infty)}$ *

42) $f(x) = \frac{3}{x^2-1}$ $\quad g(x) = x+1$

Domain: $(x+1)(x-1)=0$ $\quad$ $\boxed{\text{Domain: } (-\infty,\infty)}$

$x \neq -1,\ x \neq 1$

$\boxed{(-\infty,-1) \cup (-1,1) \cup (1,\infty)}$

a) $f \circ g = \frac{3}{(x+1)^2-1} = \frac{3}{(x+1)(x+1)-1} = \frac{3}{x^2+2x+1-1} = \boxed{\frac{3}{x^2+2x}}$

$x(x+2) \neq 0$

$x \neq 0 \quad x \neq -2$

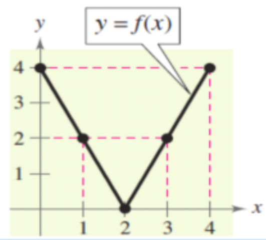
Domain: $\boxed{(-\infty,-2) \cup (-2,0) \cup (0,\infty)}$

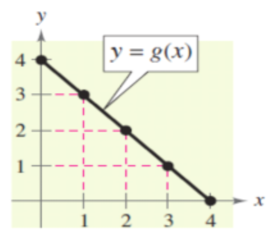
b) $g \circ f = \frac{3}{x^2-1} + 1 \cdot \frac{x^2-1}{x^2-1} = \frac{3}{x^2-1} + \frac{x^2-1}{x^2-1} = \frac{3+x^2-1}{x^2-1} = \boxed{\frac{x^2+2}{x^2-1}}$

Domain: $\boxed{(-\infty,-1) \cup (-1,1) \cup (1,\infty)}$ $\quad (x+1)(x-1)$

$x \neq -1,\ x \neq 1$

Use the graphs to evaluate the functions.





44) a) $(f-g)(1)$

$= f(1) - g(1)$

$= 2 - 3 = \boxed{-1}$

b) $(fg)(4)$

$= f(4) \cdot g(4)$

$= (4)(0) = \boxed{0}$

46) a) $(f \circ g)(1)$

$= f(g(1)) = f(3) = \boxed{2}$

b) $(g \circ f)(3)$

$= g(f(3)) = g(2) = \boxed{2}$