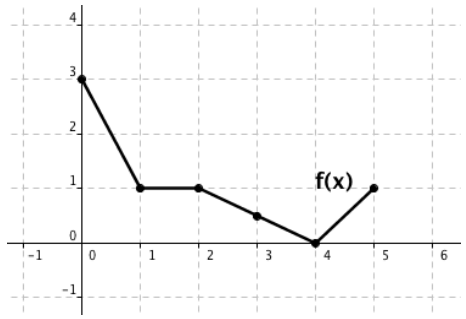
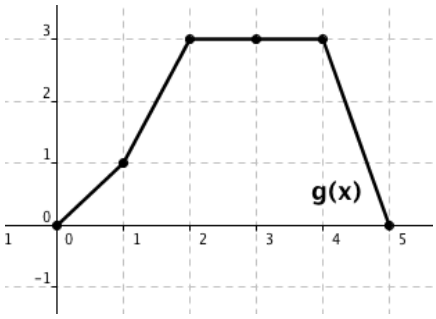
Function Compositions WKST

1. Use the graphs of *f* and *g* to find each value.





a. $(f+g)(3)$ b. $(f-g)(2)$ c. $(fg)(4)$ d. $\left(\frac{g}{f}\right)(4)$ e. $\left(\frac{f}{g}\right)(2)$

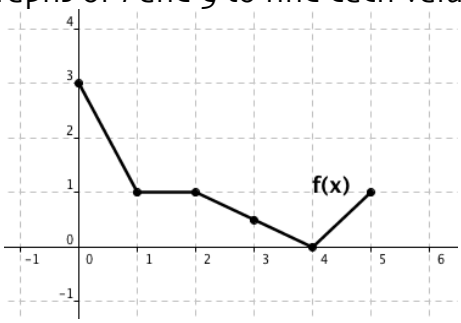
2. Given the following functions, perform the indicated operation and state the domain in interval notation. Do not rationalize the denominator.

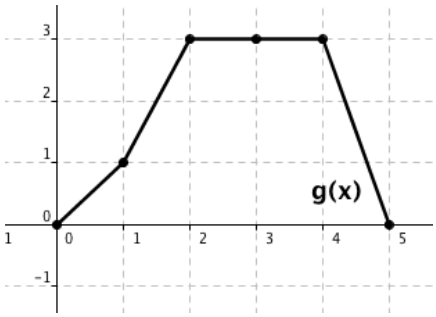
$f(x)=6x^2-x-1$	$g(x)=x-6$	$h(x)=\frac{1}{x}$	$m(x)=8x^{5/3}$	$r(x)=\sqrt{x}$

a) $f(x)+g(x)$ b) $g(x)-f(x)$ c) $(h\cdot m)(x)$

d) $\left(\frac{m}{f}\right)(x)$ e) $(m+r)(x)$ f) $\frac{g(x)}{r(x)}$

3. Use the graphs of *f* and *g* to find each value.





a. $-2(f\circ g)(1)$ b. $(g\circ f)(5)$ c. $(f\circ g\circ f)(4)$

4. Find the value of each expression, if possible.

$f(x)=4x^{2/3}$	$g(x)=8x^{1/2}$	$m(x)=-x^{-2}$	$n(x)=64(x-2)^{-1}$

a. $(f\circ g)(27)$ b. $(m\circ g)(-4)$ c. $(m\circ m)(2)$

5. Find each composition and the state the domain in ***set*** notation.

$f(x)=\sqrt{x-7}$ $g(x)=x^2+7$ $m(x)=\frac{1}{x}$ $n(x)=4x^2-20x+16$ $p(x)=x^{1/3}$ $q(x)=x+4$

a. $(f \circ g)(x)$ b. $(g \circ f)(x)$ c. $(m \circ g)(x)$

d. $(g \circ g)(x)$ e. $(m \circ f)(x)$ f. $(p \circ q)(x)$ g. $(n \circ q)(x)$

h. $(n \circ p)(x)$ i. $(m \circ n)(x)$ j. $(m \circ p)(x)$ k. $(m \circ f \circ q)(x)$

6. What composition produces each expression?

$a(x) = x^2$ $b(x) = \sqrt[3]{x-8}$ $c(x) = \dfrac{1}{x-9}$

a. $\sqrt[3]{x^2-8}$ b. $\dfrac{1}{x^2-18x+81}$ c. x^8

ANSWERS

1.

a) 3.5 b) -2 c) 0 d) undefined e) 1/3

2.

a) $6x^2 - 7; (-\infty, \infty)$

b) $-6x^2 - 2x - 5; (-\infty, \infty)$

c) $8x^{2/3}; (-\infty, 0) \cup (0, \infty)$

d) $\frac{8x^{5/3}}{(2x-1)(3x+1)}$; $(-\infty, -1/3) \cup (-1/3, 1/2) \cup (1/2, \infty)$

e) $8x^{5/3} + x^{1/2}; [0, \infty)$

f) $\frac{x-6}{\sqrt{x}}$; $(0, \infty)$

3.

a. -2

b. 1

c. 3

4.

a. 48
b. undefined
c. -16

5.

a. $|x|$, $\{x | x \in R\}$

b. x, $\{x | x \geq 7\}$

c. $\frac{1}{x^2+7}$, $\{x | x \in R\}$

d. $x^4 + 14x^2 + 56$, $\{x | x \in R\}$

e. $\frac{\sqrt{x-7}}{x-7}$, $\{x | x > 7\}$

f. $(x+4)^{1/3}$, $\{x | x \in R\}$

g. $4x^2 + 12x$, $\{x | x \in R\}$

h. $4x^{2/3} - 20x^{1/3} + 16$, $\{x | x \in R\}$

i. $\frac{1}{4x^2 - 20x + 16}$, $\{x | x \neq 1, 4\}$

j. $\frac{x^{2/3}}{x}$, $\{x|x \neq 0\}$

k. $\frac{\sqrt{x-3}}{x-3}$, $\{x|x > 3\}$

6.

a. $(b \circ a)(x)$

b. $(a \circ c)(x)$

c. $(a \circ a \circ a)(x)$