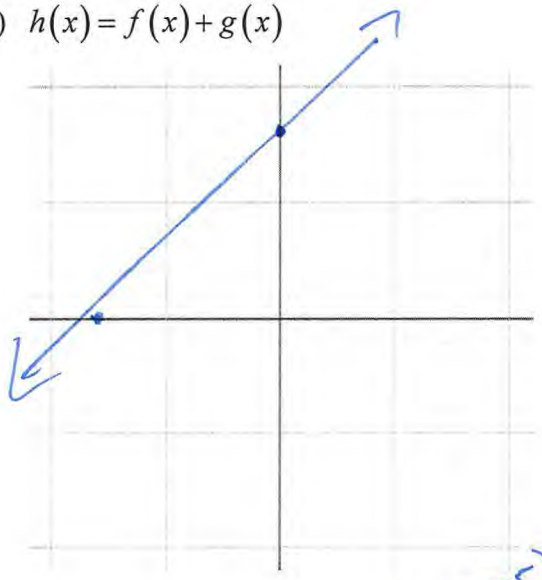
SOLUTIONS

MPC40S Chapter 10 Review Function Operations

1. Given the functions $f(x)=7-x$ and $g(x)=2x+1$, determine the equation of $h(x)$, sketch the graph of $h(x)$ and state the domain and range of $h(x)$

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

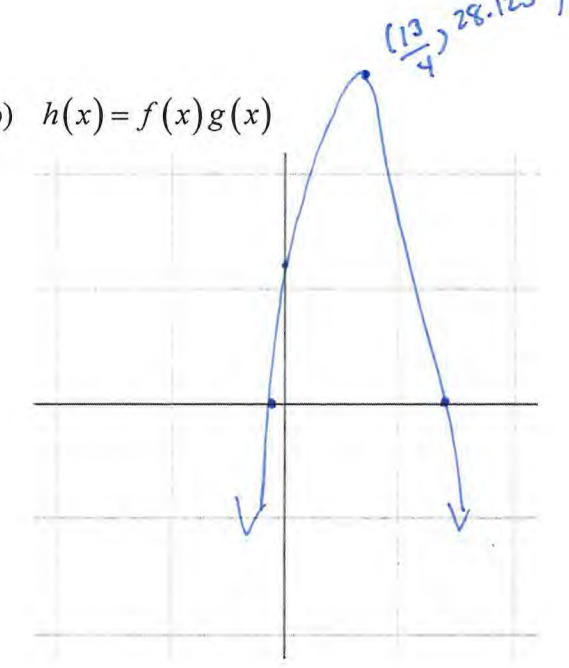


$h(x)=$ $x+8$

Domain: $(-\infty,\infty)$

Range: $(-\infty,\infty)$

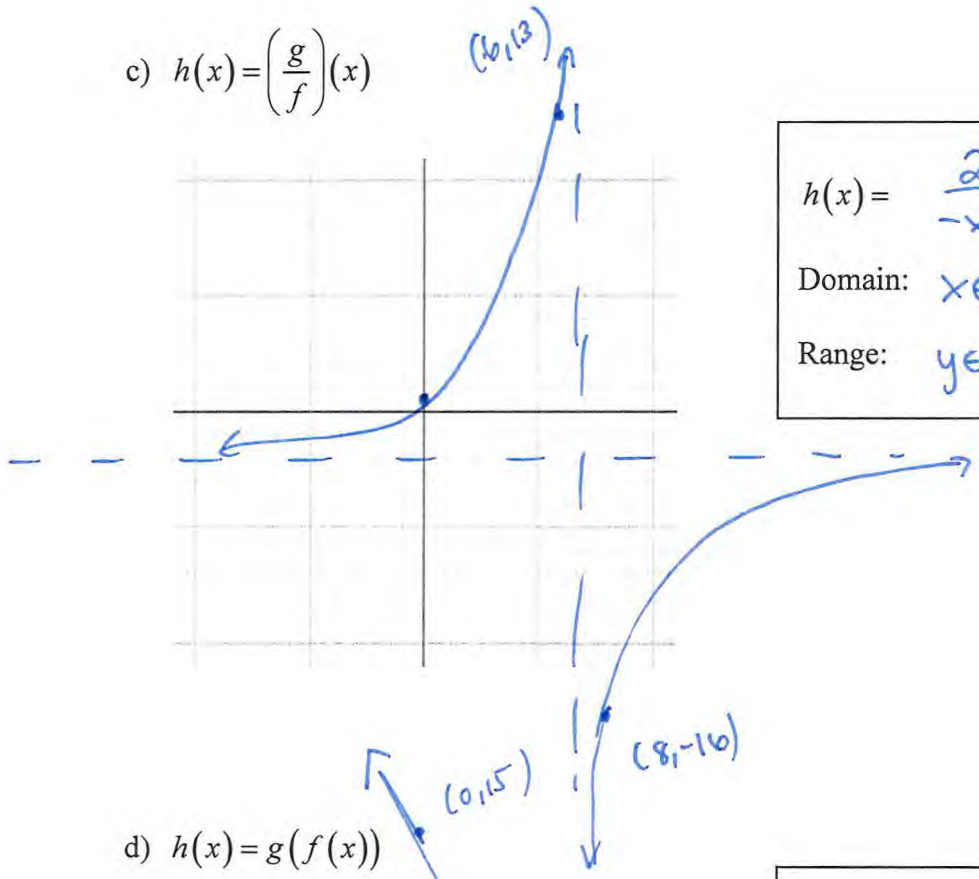
b) $h(x)=f(x)g(x)$



$h(x)=$ $-2x^2+13x+7$

Domain: $(-\infty,\infty)$

c) $h(x)=\left(\frac{g}{f}\right)(x)$

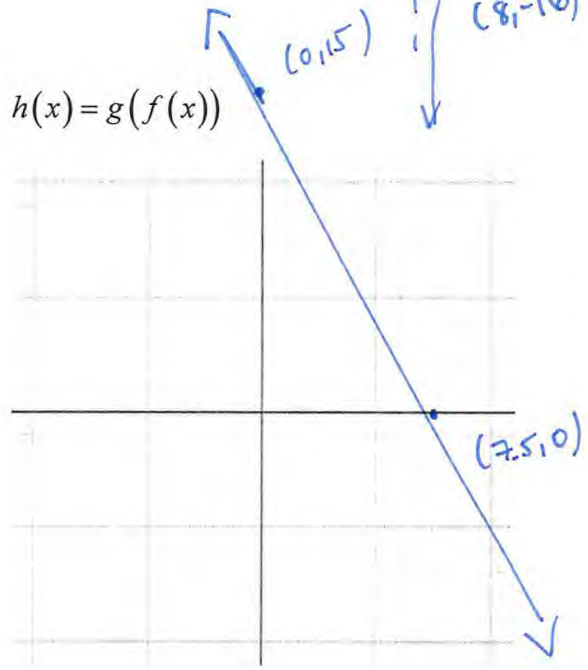


$h(x)=\dfrac{2x+1}{-x+7}$

Domain: $x\in\mathbb{R},\ x\neq 7$

Range: $y\in\mathbb{R},\ y\neq -2$

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



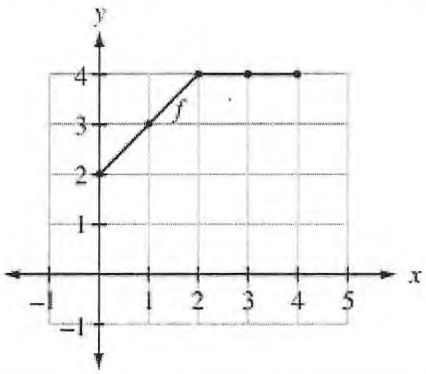
$h(x)=-2x+15$

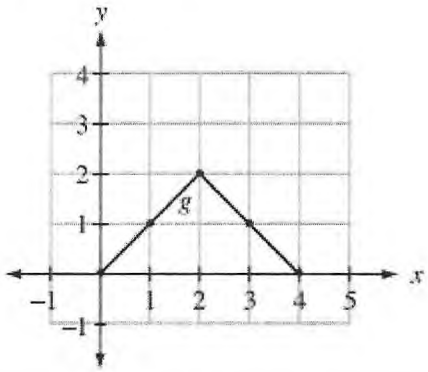
Domain: $(-\infty,\infty)$

Range: $(-\infty,\infty)$.

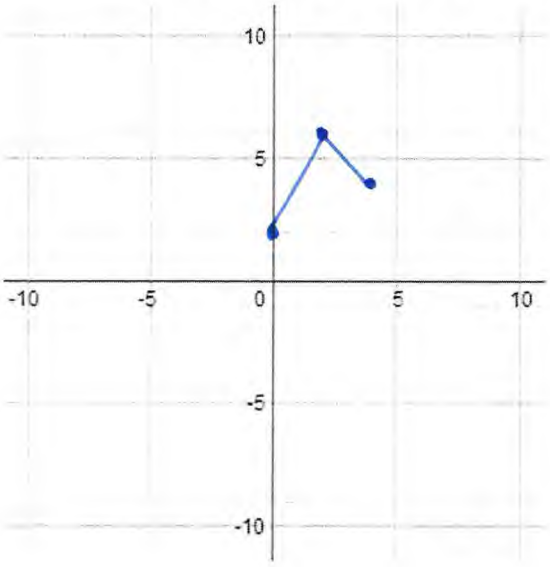
2. Use the following information to answer the next question.

The graphs of the functions $y = f(x)$ and $y = g(x)$ are shown below.



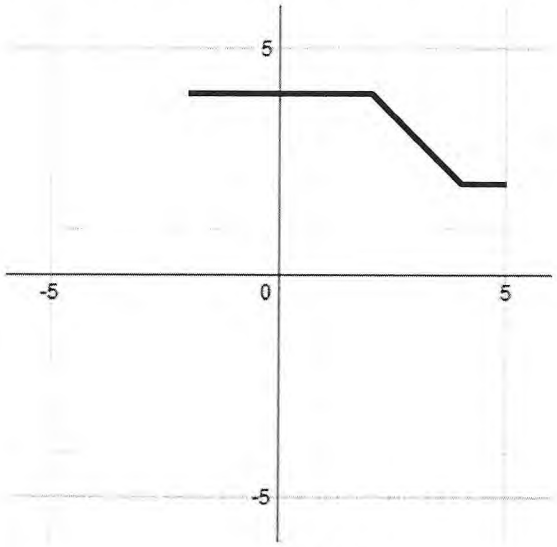


Sketch the graph of $h(x) = f(x) + g(x)$.

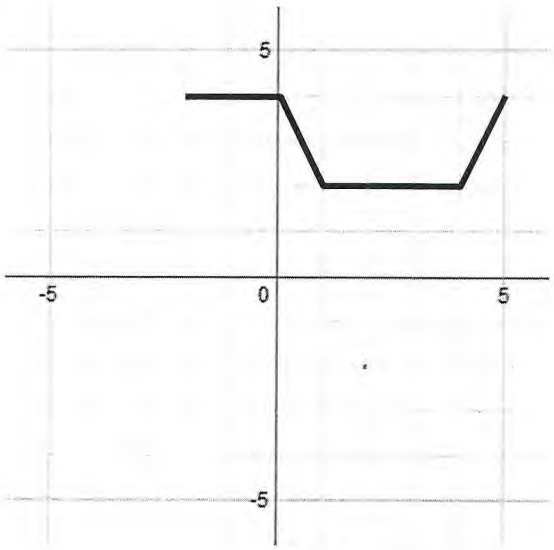


3. Use the following information to answer the next question.

The graphs of $y = f(x)$ and $y = g(x)$ are show below.

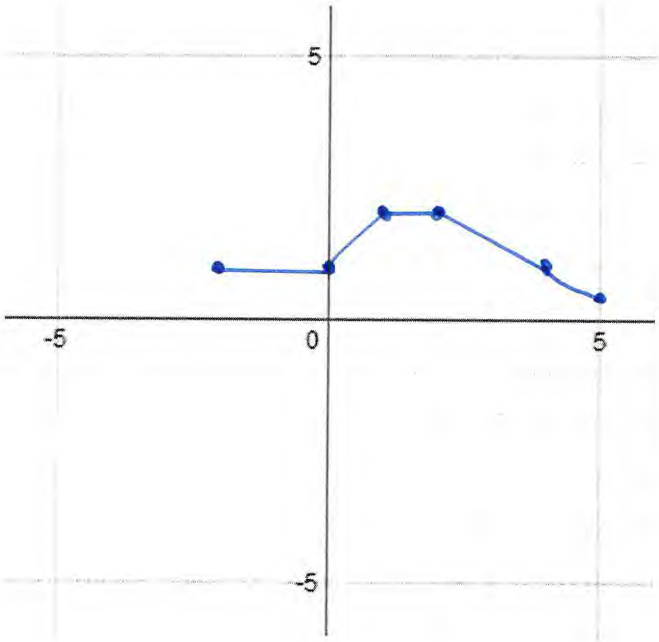


$y = f(x)$



$y = g(x)$

Sketch the graph of $h(x) = \left(\frac{f}{g}\right)(x)$



4. Given $f(x)=\sqrt{x-1}$, $g(x)=x^2+3$, and $h(x)=2x-5$, determine

a) $(g+h)(3)=$ $g(3)+h(3)$

$= 12+1$

$= 13$

b) $\left(\frac{g}{h}\right)(5)=$ $\frac{g(5)}{h(5)}$

$= \frac{28}{5}$

c) $h(h(10))=$ $h(15)$

$= 25$

d) $h(g(3))=$ $h(12)$

$= 19$

e) $g(h(3))=$ $g(1)$

$= 4$

f) $g(x)+h(x)=$ $x^2+3+2x-5$

$= x^2+2x-2.$

g) $(h\circ g\circ f)(x)=$ $h(g(f(x)))$, $x\geq 1$

$= h(g(\sqrt{x-1}))$

$= h((\sqrt{x-1})^2+3)$

$= h(x+2)$

$= 2x-1$, $x\geq 1$

important!

5. Given that $f(x)+g(x)=4x^2-2x+5$, determine possible equations for $y=f(x)$ and $y=g(x)$.

$f(x) = 4x^2$

$g(x) = -2x+5$

Answers may Vary!

6. Given that $f(g(x))=2\sqrt{x-2}+3$, determine possible equations for $y=f(x)$ and $y=g(x)$.

$f(x) = 2x+3$

$g(x) = \sqrt{x+2}$

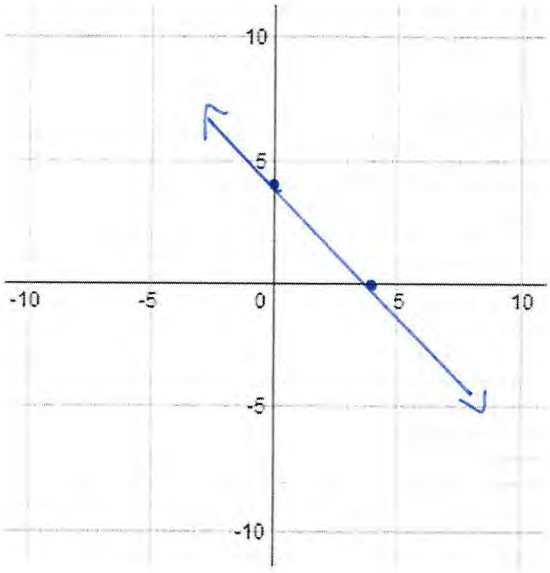
or if

$f(x) = 2\sqrt{x}+3$

$g(x) = x-2$

$x \geq 0$ stated in original.

7. Given that $f(x)=2x+4$ and $g(x)=-\frac{1}{2}x+6$, sketch the graph of $h(x)=(g\circ f)(x)$.



$g(f(x))$

$g(2x+4)$

$= -\frac{1}{2}(2x+4)+6$

$= -x-2+6$

$= -x+4$