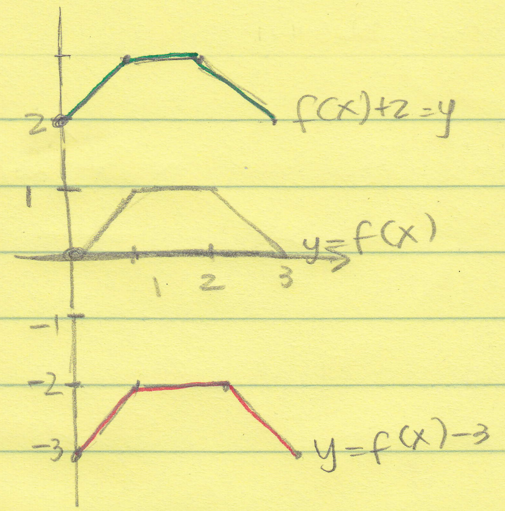
#121

p 128

①

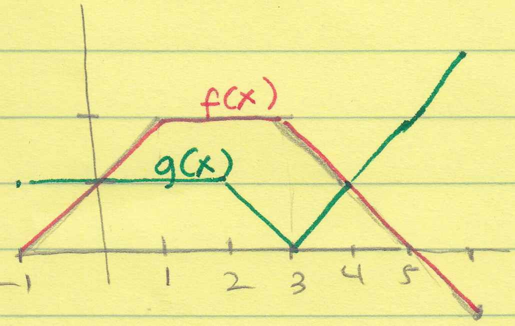


x	y	y +2	y −3
0	0	2	−3
1	1	3	−2
2	1	3	−2
3	0	2	−3

$f(x)+2 \rightarrow$ add 2 to y

$f(x)-3 \rightarrow$ subtract 3 from y

③



x	f(x)	g(x)
1	2	(1)

ⓐ $f(1)-g(1)=$
$2-1=1$

ⓑ $f(x)-g(x)$ is positive when the y values of the red graph is > y values of the green graph

$0<x<4$

* $f(x)-g(x)$ is negative when the y values of the red graph is < y values of the green graph

$-1\leq x<0$; or $4<x\leq 6$

* $f(x)-g(x)=0$ when the 2 graphs intersect

0 , 4

5 $f(x)=x^3-1$, $g(x)=x-1$

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

9b $(f\cdot g)(x)=f(g(x))=f(x-1)=(x-1)^3-1$

$(x-1)(x-1)=x^2-2x+1$

out of order

$(x-1)(x^2-2x+1)=x^3-2x^2+x-x^2+2x-1$

$=x^3-3x^2+3x-1$

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

7. $(f \cdot g)(x) = f(x)\,g(x)$

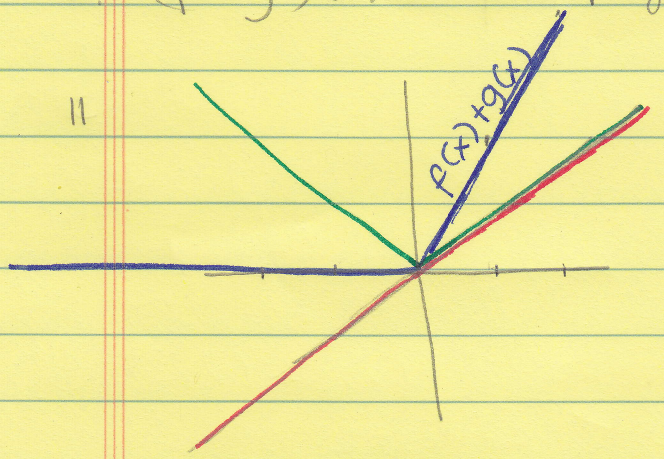
$= (x^3-1)(x-1) = x^4 - x^3 - x + 1$

9. $f(g(2)) \Rightarrow g(2) = 2-1 = 1$

$f(g(2)) = f(1) = 1^3 - 1 = 0$

b. $(f \circ g)(x) =$ see page 1.

11



$f(x) = x \qquad g(x) = |x|$

x	f(x)	g(x)	f+g
−2	−2	2	0
−1	−1	1	0
0	0	0	0
1	1	1	2
2	2	2	4
3	3	3	6

17 $f(x) = 2x-3 \qquad g(x) = \dfrac{x+3}{2}\ ; \ h(x) = 3x+2$

$$f(g(x)) = f\left(\frac{x+3}{2}\right) = 2\left(\frac{x+3}{2}\right) - 3 = x+3-3 = x$$

$$g(f(x)) = g(2x-3) = \frac{(2x-3)+3}{2} = \frac{2x}{2} = x$$

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

(b) $f(h(x)) = f(3x+2) = 2(3x+2) - 3 = 6x+4-3 = 6x+1$

$h(f(x)) = h(2x-3) = 3(2x-3)+2 = 6x-9+2 = 6x-7$

$\longrightarrow f(h(x) \neq h(f(x))$

121/3

$f(x)=\sqrt{x}$; $g(x)=6x-3$; $h(x)=\frac{x}{3}$

19 (a) $f(g(h(6)))=$

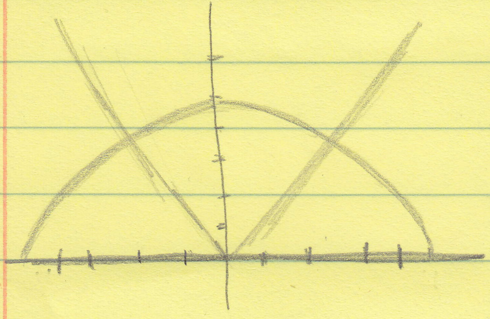
$h(6)=\frac{6}{3}=2$

$g(2)=6(2)-3=9$

$f(9)=\sqrt{9}=3$

#33 is at the end (page 4 and 5)

p127 CE 1.



$(f+g)(0)=f(0)+g(0)=$

$5+0=5$

$(f+g)(3)=f(3)+g(3)=$

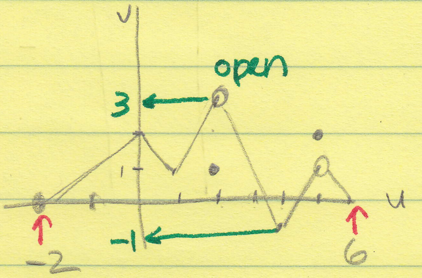
$4+4=8$

p122 (2)

not a function

doesn't pass the VLT

(4)

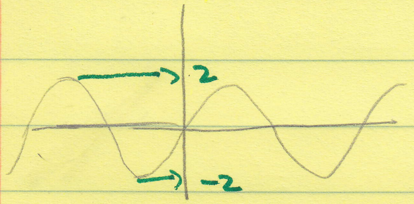


It is a function ; passes VLT

D: $-2 \leq u \leq 6$

R: $-1 \leq v < 3$

6



Function

D: all real #s

R: $-2 \leq s \leq 2$

10 $f(t)=\frac{1}{t+3}$ $\rightarrow$ denominators $\neq 0$ $\rightarrow$ $t+3\neq 0$

$t\neq -3$

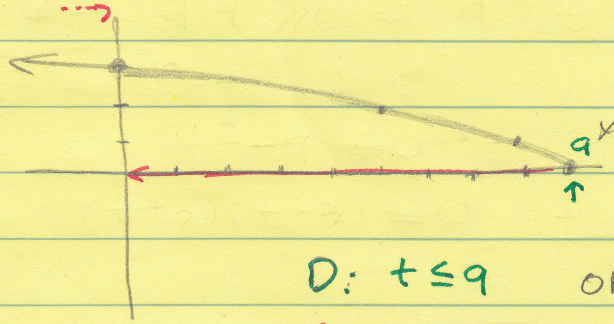
b. $g(t)=\frac{t+2}{t^2+5t+6}$ $\rightarrow$ $t^2+5t+6\neq 0$

$(t+2)(t+3)\neq 0 \rightarrow t\neq -2 ; t\neq -3$

121/4

12b $g(t) = \sqrt{9-t}$

t	$g(t)$
0	3
5	2
8	1
9	0



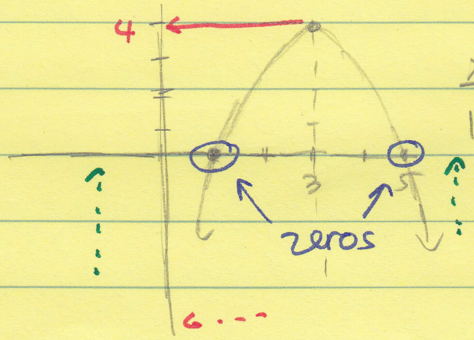
D: $t \le 9$ or $9-t \geq 0 \rightarrow 9 \geq t$ or $t \le 9$

R: y or $g(t) \geq 0$

14 $g(x) = 4 - (x-3)^2$

$= -(x-3)^2 + 4 \rightarrow$ vertex $= (3,4)$ opens down

AOS: $x = 3$



x	y
1	0
5	0

D: all real #s

R: $y \le 4$ or $g(x) \le 4$

zeros: 1, 5

b 128

33 $f(x) = 2x$ $g(x) = \sqrt{16-x^2}$

$f(g(x))$

$f(\sqrt{16-x^2})$ Domain of $\sqrt{16-x^2}$: $16 - x^2 \geq 0$

$(4+x)(4-x) \geq 0$

$-$ $+$ $-$ 5: $+$ $-$

-4 4 0: $+$ $+$

$-4 \le x \le 4$ -5: $-$ $+$

$f(\sqrt{16-x^2}) = 2\sqrt{16-x^2}$

Domain of $\sqrt{16-x^2}$ is $-4 \le x \le 4$

so Domain: $-4 \le x \le 4$

121/5

33. $g(f(x)) = g(2x)$ Domain of $2x$ is all real #s

$= \sqrt{16-(2x)^2}$

$= \sqrt{16-4x^2} \longrightarrow$ Domain of $\sqrt{16-4x^2} = 16-4x^2 \geq 0$

$= \sqrt{4(4-x^2)}$ $(4+2x)(4-2x) \geq 0$

$= 2\sqrt{4-x^2}$

$-$ $+$ $-$ 3: $+ -$

-2 2 0: $+ +$

$\boxed{D: -2 \leq x \leq 2}$ -3: $- +$