Kory Shannon

pg 1

Special Problems Assignment 2

Section 2.1 22, 26, 49, 70

22. $f(x) = x\sqrt{9-x^2} + c$

$f(2) = 4$

$f(2) = 2\sqrt{9-4} + c$

$= 2\sqrt{5} + c = 4$

so $c = 4 - 2\sqrt{5}$

Narrative: This is pretty straightforward. To go thru the point (2,4) you need $f(2)=4$ so plug in 2 and solve for c.

26. $g(x) = \frac{2x+1}{x-1}$ so

$x \neq 1$

Domain is $(-\infty,1)\cup(1,\infty)$

or all real #s $x \neq 1$.

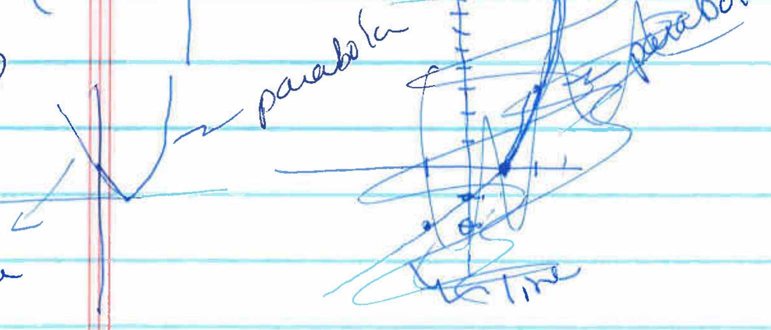
The domain is the largest set of real numbers for which g makes sense. The only numbers you can not plug into g is $x=1$.

49. $f(x) = \begin{cases} -x+1 & \text{if } x \le 1 \\ x^2-1 & \text{if } x > 1 \end{cases}$

	x	f
line	1	0
	0	1
	-1	+2
parabola w/ lowest pt at (0,-1)	2	3
	3	8

Forgot to answer... the Domain is obviously (I hope) all real numbers. The range is all numbers greater than or equal to 0.

(1,-1) oops



line

ok this is an easy problem and I can still mess it up. there are two graphs x^2 moved down one and the line thru (1,0) and (0,1) draw both then make the right one valid in each range.

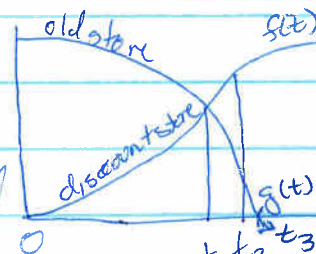
S. P. cont.

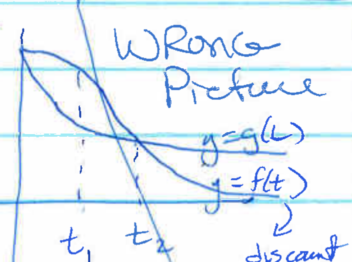
70. a) $A(c) = 1.053c$

b) $A(1520) = (1.053)(1520)$
$= 1600.56$

the adjusted benefit A is 1.053 times the current benefit c Since to add 5.3% of c you take $C + .053C = 1.053C$. For b) I plugged in 1520 - I used a calculator to multiply.

Section 2.6 8, 24





no wonder it didn't make sense!

8. a. the revenue of the established store is decreasing at the slowest when $t=0$. and at the
b. fastest rate at t_3
c. The revenue of the discount store overtakes the old store at t_1 when the two curves intersect.
d. The revenue of the discount store increases at the fastest rate at t_2

Narrative:

I just looked at the graph increasing is going up - rate is the absolute value of the slope. Dec. is going down. I found the shallowest and steepest slopes for g(t) for a & b. The intersection for c and the steepest pt on f for d.

Special Prob's cont.

24. a) $f(x) = x^2 + 6x$

$$m_{sec} = \frac{(x+h)^2 + 6(x+h) - x^2 - 6x}{h}$$

$$= \frac{\cancel{x^2} + 2xh + h^2 + \cancel{6x} + 6h - \cancel{x^2} - \cancel{6x}}{h}$$

$$= \frac{2xh + h^2 + 6h}{h} = 2x + 6 + h \Rightarrow m_{tan} = 2x+6$$

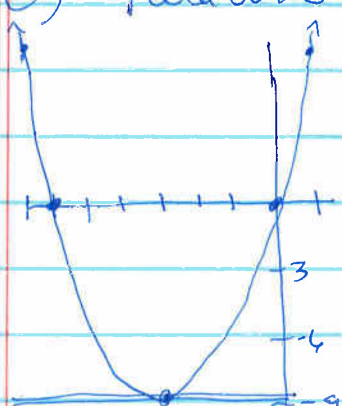
so $f'(x) = 2x + 6$

b) horizontal $\Rightarrow m = 0$ so

$2x + 6 = 0$ if $x = -3$

c) Parabola w/ vertex @ $x = -3$

x	y
0	0
-6	0
-3	-9
1	7
-7	7



d) the rate of change at the horizonal tangent is, of course, 0.

I used the method we did in class found a formula for the slope of the secant $2x+6+h$ then let $h=0$ to get the slope of the tangent which is the derivative I set that $=0$ to find the horizontal tangent.

Then I plugged in some key points - recognized that $f(0) = f(-6) = 0$ and the function is a parabola w/ vertex at the horizontal tangent so that's what I drew...

Overall this assignment was not difficult I just needed to be more careful in a few places.