Professor Katiraie Calculus One Spring 2008 Quiz 1 Form A Total Possible Points = 20

Name_____ Sections 1.1 - 1.3

Solve the problem.

1) The information in the chart gives the salary of a person for the stated years. Model the data with a linear function (Find a linear function) using the points (1, 24,300) and (3, 26,700).

Year, x	Salary, y
1990, 0	$23,500
1991, 1	$24,300
1992, 2	$25,200
1993, 3	$26,700
1994, 4	$27,200

$m = \frac{26700-24300}{3-1} = 1200$

$y - 24300 = 1200(x-1)$

$y = 1200x - 1200 + 24300 = \boxed{1200x + 23100}$

2) A shoe company will make a new type of shoe. The fixed cost for the production will be $24,000. The variable cost will be $35 per pair of shoes. The shoes will sell for $108 for each pair. How many pairs of shoes will have to be sold for the company to break even on this new line of shoes?

Cost $= 24000 + 35x$ Revenue $= 108x$

at Break even Cost = Revenue

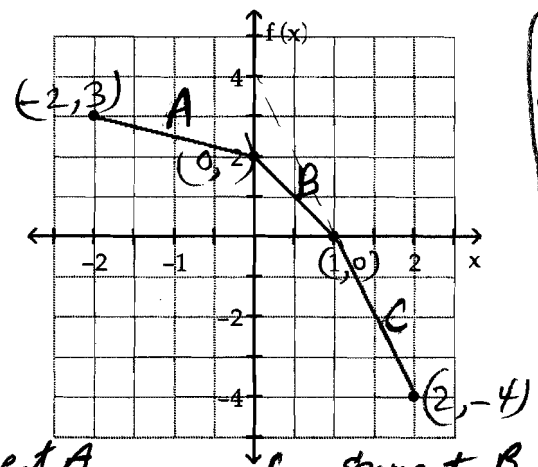
$24000 + 35x = 108x \Rightarrow x = \frac{24000}{73} \approx 329$ Pairs

3) When going more than 38 miles per hour, the gas mileage of a certain car fits the model y = 43.81 - .395x where x is the speed of the car in miles per hour and y is the miles per gallon of gasoline. Based on this model, at what speed will the car average 15 miles per gallon? (Round to nearest whole number.)

$15 = 43.81 - 0.395x \Rightarrow x = 72.94 \approx \boxed{73 \text{ mph}}$

Write a function for the following graph. Assume that the relationships are linear.

4)



$$y = f(x) = \begin{cases} -\frac{1}{2}x + 2; & -2 < x \le 0 \\ -2x + 2; & 0 < x \le 1 \\ -4x + 4 & 1 < x \le 2 \end{cases}$$

Segment A

$m = \frac{2-3}{0--2} = \frac{-1}{2}$

y-intercept (0,2)

$y = -\frac{1}{2}x + 2$

Segment B

$m = \frac{0-2}{1-0} = -2$

y-intercept (0,2)

$y = -2x + 2$

Segment C

$m = \frac{-4-0}{2-1} = -4$

$y - 0 = -4(x-1)$

$y = -4x + 4$

Compute and simplify the difference quotient [f(x + h) – f(x)]/h.

5) $f(x) = 2x^2 + 13x - 10$

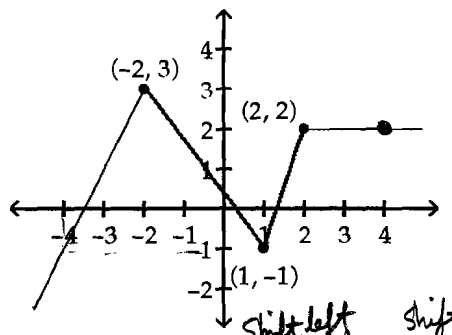
$f(x+h) = 2(x+h)^2 + 13(x+h) - 10 = 2x^2 + 4xh + 2h^2 + 13x + 13h - 10$

$f(x+h) - f(x) = 2x^2 + 4xh + 2h^2 + 13x + 13h - 10 - (2x^2 + 13x - 10)$

$= h(4x + 2h + 13)$

$$\frac{f(x+h) - f(x)}{h} = \frac{h(4x+2h+13)}{h} = \boxed{4x + 2h + 13}$$

Using the graph below, sketch the graph of the given function.



$y = f(x+2) - 1$

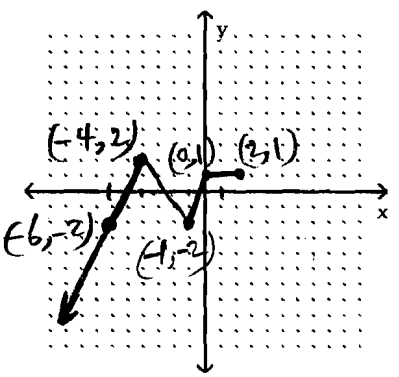
means shift left 2 units and shift down 1 unit

x	y
-4	-1
-2	3
1	-1
2	2
4	2

Shift left 2 unit

Shift Down 1 unit

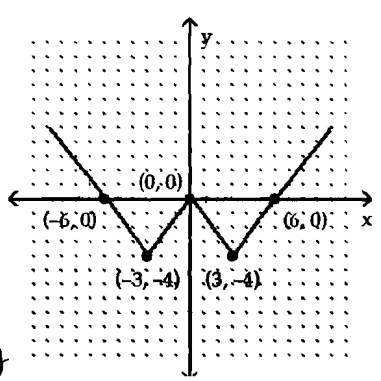
-6	-2
-4	2
-1	-2
0	1
2	1

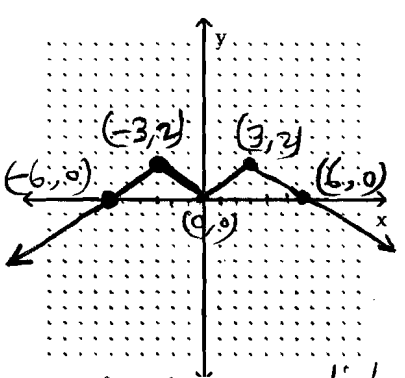


6) Sketch the Graph of $y = f(x + 2) - 1$

Graph the indicated new function, given the graph for y = f(x).

7) $y = -\frac{1}{2}f(x)$ this means multiply the original y values by $-\frac{1}{2}$





x	y
-6	0
-3	-4
0	0
3	-4
6	0

y means, which is the old y multiplied by $-\frac{1}{2}$

x	y
-6	0
-3	2
0	0
3	+2
6	0