Question 1 :(5 Points)

If man has twice as much money invested in bonds paying 10% as he does in stocks paying 12%. Find the total amount he has invested if the total annual interest income from both is $8,640.

Let X be the amount of money invested in bonds

y " " " " " " stocks

$x = 2y$ --- (1) , $(.1)X + .12y = 8640$ --- (2) } (2)

By Substituting X from (1) in (2) $\Rightarrow (.1)(2y) + .12y = 8640 \Rightarrow 0.32y = 8640 \Rightarrow y = \frac{8640}{.32}$

$y = 27,000$ } (2)

$\Rightarrow x = 2y = 2(27,000) = 54,000$

$\therefore$ The total amount $= 54,000 + 27,000 = 81,000$ } (1)

Question 2 :(5 Points)

Company A rents cars for $6 a day and $0.14 for every mile driven. Company B rents cars for $12 a day and $0.08 for every mile driven. If you want to rent a car for 5 days. What is the maximum number of miles that you can drive a Company A car during the f days if it is to cost less than a Company B car?

Let m be the number of miles

Cost of a Company A < Cost of a Company B

$5(6) + .14m < 5(12) + .08m$ } (2)

$30 + .14m < 60 + .08m$

$0.14m - .08m < 60 - 30 \Rightarrow 0.06m < 30 \Rightarrow m < \frac{30}{0.06}$ } (2)

$\Rightarrow m < 500$ miles.

The maximum number of miles is 499 } (1)

Question 3 :(10 Points)

a) Find the equation of the line that passing through (3, -4) and perpendicular to the line $y = 3 + 2x$.(4 Points)

The line is perpendicular to $y = 3 + 2x \Rightarrow$ Slope $= \frac{-1}{2}$. (1)

$\therefore$ The equation: $y - y_1 = m(x - x_1)$ } (1)

$y + 4 = \frac{-1}{2}(x - 3) \Rightarrow y = \frac{-1}{2}x + \frac{3}{2} - 4$

$y = -\frac{1}{2}x - \frac{5}{2}$. } (2)

b) The demand function for a manufacturer product is $p = 1100 - 2q$, where p the price in dollars is, q is the units are demanded per month. Find the number of units that maximizes the total revenue and determine this revenue.(6 Points)

The total revenue $= pq$

$= (1100 - 2q)q = 1100q - 2q^2$ } (1)

$a < 0 \Rightarrow$ it has amaximum value at the vertex.

(1) The vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

$\frac{-b}{2a} = \frac{-1100}{2(-2)} = \frac{-1100}{-4} = 275$

$f\left(\frac{-b}{2a}\right) = f(275) = 1100(275) - 2(275)^2 = \$151,250$ } (2)

$\therefore$ The number of units $= 275$ units

The maximum revenue $= \$151,250$ } (2)