What do you have to study for this unit test?

1. Class notes and class work we did from March 23 until today. (Check reypark.weebly.com, if you lost any notes….)
2. All the homework questions we did from March 23 until today.
3. Today's classwork and HW

Note: Leave radical numbers as their original forms, meaning do not change them to decimal numbers until the therefore statement.

Q1) Last year, a banquet hall charged $40 per person, and 80 people attended the banquet dinner. This year, the manager said that for every 10 extra people that attended the banquet, they will decrease the price by $1.50 per person. What size group would maximize the revenue for the hall this year?

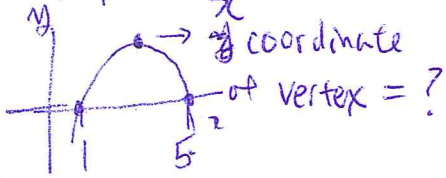
Let x represent the increase of people by 10 people. For example

when $x=1 \rightarrow$ 10 more people will attend. $\rightarrow$ price ↓ by $1.50.

Let $F(x)$ (y) represent revenue.

$F(x)$ = Rev = Price x Quantity (= how many you sold)

$F(x) = (40 - 1.5x) \times (80 + 10x)$



$0 = (40 - 1.5x)(80 + 10x)$

* If $40 - 1.5x = 0 \rightarrow y = 0$

$-1.5x = -40$

$x = (-40) \div (-1.5) = \frac{-40}{-1.5} = 26.67$

* If $80 + 10x = 0 \rightarrow y = 0$

$10x = -80$

$x = -8$

* To find x coordinate of vertex : $\frac{-8 + 26.67}{2} = 9.3$

* sub $x = 9.3$ into equation $F(x) = (40 - 1.5(9.3)) \times (80 + 10(9.3))$

$= 26.05 \times 173 = \$4506.65$

Answer

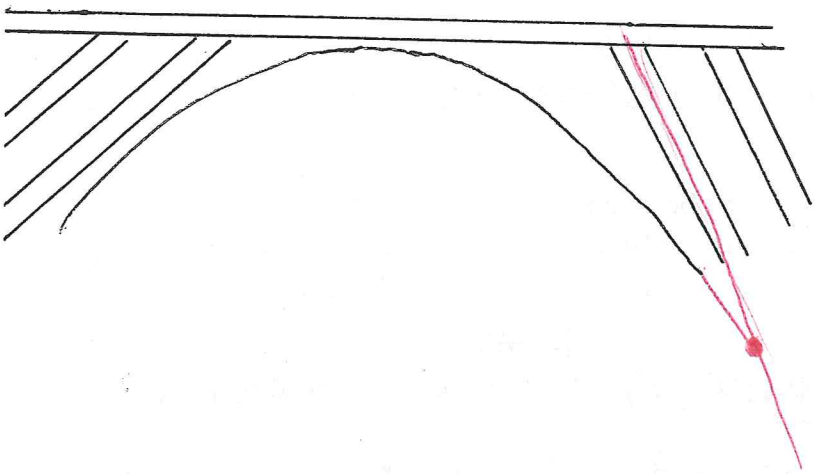
$80 + 10(9.3)$

$= 173$ people

∴ 173 people would maximize the revenue for this year.

Q2) A bridge has a parabolic support modelled by the equation $y = -\frac{1}{200}x^2 + \frac{6}{25}x - 5$

Were the x axis represents the bridge surface. There are also parallel support beams below the bridge. Each support beam must have a slope of either 0.8 or -0.8. Using a slope of -0.8, find the y intercept of the line associated with the longest support beam. Hint: The longest beam will be the one along the line that touches the parabolic support at just one point.



$y = -0.8x + b$

$b^2 - 4ac = 0$

$-0.8x + b \overset{?}{=} -\frac{1}{200}x^2 + \frac{6}{25}x - 5$

$0 = -\frac{1}{200}x^2 + \frac{6}{25}x + \frac{8}{10}x - 5 - b$

$0 = -\frac{1}{200}x^2 + \frac{12x + 40x}{50} - 5 - b$

$0 = -\frac{1}{200}x^2 + \frac{52x}{50} - 5 - b$

$\times -200 \quad \times -200 \quad \times -200 \quad \times -200$

$0 = x^2 - 208x + 1000 + 200b$

$a = 1, \quad b = -208, \quad c = 1000 + 200b$

$* \; b^2 - 4ac = 0$

$(-208)^2 - 4(1)(1000 + 200b) = 0$

$43264 - 4(1000 + 200b) = 0$

$43264 - 4000 - 800b = 0$

$39264 - 800b = 0$

$-800b = -39264$

$\frac{-800b}{-800} = \frac{-39264}{-800}$

$b = 49.08$

∴ The y intercept is 49.08 of the tangent line

More Practice Questions

Page 72: Q11 to Q22