Econ 102 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Summer 2014

Answers to Quiz #0

Please write all answers neatly and legibly.

1. Suppose that you are given the line X = 2Y + 10. You are also told that for every Y value the X value has now increased by 10 units. Write the equation for this new line. In your answer show all of your work.

Answer:

The new line will have shifted to the right so that at every Y value the new X value is equal to the old X value plus 10 units. So, we can write this new line as X = 2Y + 20. The two lines will be parallel to one another and therefore have the same slope but the new line will intersect the x-axis at 20 instead of the original x-intercept of 10.

2. Suppose that you are told that the point (Q, P) = (20, 0) sits on a straight line with Q measured along the x-axis. You are also told that on this straight line every time the y variable increases by 20 units, the x variable increases by 5 units. Write an equation in slope intercept form given this information. Show your work and explain the steps you used to find your answer.

Answer:

From the information you know (X, Y) = (Q, P) = (20, 0) is on the line. Additionally, from the information you could get the slope as 20/5 or 4. Alternatively, you can find one more point on the line in order to calculate the slope of the line, the y-intercept and finally an equation for the line. Looking for that second point, we know that if X increases by 5 units from 20 units, the X value will be 25. If Y is initially equal to 0 units, then the Y value will increase by 20 units when X increases from 20 to 25 units: the new Y value when X is equal to 25 will be 20. Thus, the point (25, 20) also sits on this line. We can calculate the slope: slope = (20 – 0)/(25 – 20) = 4. The equation can be written as Y = b + 4X and using the point (20, 0) we have: 0 = b + 4(20) or b = -80. Thus, the equation is Y = 4X – 80 or P = 4Q - 80.

3. Max’s scores in chemistry thus far are as follows:

First Midterm Score: 18 out of a possible 20 points

Second Midterm Score: 40 out of a possible 50 points

Third Midterm Score: 180 out of a possible 250 points

If all three midterms are treated as having equal weights, what is Max’s average in his chemistry class if the grades are calculated on a 200 point scale? Show how you found your answers and the steps you took to get your answer.

Answer:

First, let’s convert the three midterms to a 200 point scale as well as Max’s three scores on these midterms to scores on a 200 point scale:

(First Midterm)(Scale Factor) = 200 points

(20 points)(Scale Factor) = 200 points

Scale Factor = 10

(Max’s First Midterm Score)(Scale Factor for First Midterm) = Max’s Score on First Midterm using 200 point scale

(18)(10) = 180 points on the first midterm when on a 200 point scale

(Second Midterm)(Scale Factor) = 200 points

(50 points)(Scale Factor) = 200 points

Scale Factor = 4

(Max’s Second Midterm Score)(Scale Factor for Second Midterm) = Max’s Score on Second Midterm using 200 point scale

(40)(4) = 160 points on the second midterm when on a 200 point scale

Now, let’s convert the third midterm to a 200 point scale:

(Third Midterm)(Scale Factor) = 200 points

(250 points)(Scale Factor) = 200 points

Scale Factor = 0.8

(Max’s Third Midterm Score)(Scale Factor for Third Midterm) = Max’s Score on Third Midterm using 200 point scale

(180)(0.8) = 144 points on the third midterm when on a 200 point scale

Then, to find Max’s average on these three equally weighted midterms on a 200 point scale we need to add up the new midterm scores measured on the 200 point scale and then divide by 3, the number of midterms that Max has taken. Thus, (180 + 160 + 144)/3 = 161.33

4. Suppose that Max (see problem #3) knows that to get an A in chemistry he must achieve an average of 160 points on a 200 point scale. He has taken the three midterms listed in problem #3 and now only has a final left to achieve his goal of an A in the class. If the final is on a 100 point scale but is weighted equivalently to each midterm (so each exam in the class is weighted as 25% of the final grade), what minimum score must Max achieve on this final to reach his goal? Remember that the final is on a 100 point scale. Show your work!

Answer:

From problem 3 we know that Max currently has scores on a 200 point scale of 180, 160 and 144. We also know that Max needs to have a final weighted average of 160 on a 200 point scale to earn an A in the class. We can set this problem up as follows: (Midterm 1 Score + Midterm 2 Score + Midterm 3 Score + Final Score)/4 = 160 where all exams are graded on a 200 point scale. Thus,

(180 + 160 + 144 + F)/4 = 160 where F is the final score on a 200 point scale.

Solving this we get:

180 + 160 + 144 + F = 640

640 – 484 = F

F = 156 on a 200 point scale

Of F = 78 on a 100 point scale

5. Suppose you are told that the two points (X, Y) = (20, 90) and (-10, -60) sit on line 1. You are told that the two points (X, Y) = (40, 85) and (-10, -15) sit on line 2. Find the (X, Y) where line 1 and line 2 intersect one another given this information. Show your work.

Answer:

We will need to write an equation for line 1 and an equation for line 2 in order to find (X, Y) where these two lines intersect. For line 1, we have slope = (90 –(-60))/(20 – (-10)) = 5. Line 1 can therefore be written as Y = 5X + b and then using one of the given points we have 90 = 5(20) + b or b = -10. Thus, line 1 is given by the equation Y = 5X – 10.

For line 2, we have slope = 85 – (-15))/(40 – (-10)) = 100/50 = 2. Line 2 can therefore be written as Y = b + 2X and then using one of the given points we have 85 = b + (2)(40) or b = 5. Thus, line 2 is given by the equation Y = 2X + 5.

Using these two equations to find the solution we have:

5X – 10 = 2X + 5

3X = 15

X = 5

Y = 5X - 10 = 5(5) – 10 = 15

Or, Y = 2X + 5 = 2(5) + 5 = 15

(X, Y) = (5, 15)