Economics 101 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Summer 2014

Answers to Quiz #0

Please write your answers neatly and legibly.

1. (Checking your algebra and your recall of the rules of fractions) Suppose you are given two lines:

Y = (1/3)X + 9

Y = 3 – (1/6)X

Given these two lines find the point of intersection (X, Y) for these two lines. Show all your work in finding the solution.

Answer:

Y = (1/3)X + 9 and Y = 3 – (1/6)X

So, (1/3)X + 9 = 3 – (1/6)X

6[(1/3)X + 9] = 6[3 – (1/6)X]

2X + 54 = 18 – X

3X = -36

X = -12

Y = (1/3)X + 9

Y = (1/3)(-12) + 9 = -4 + 9 = 5

Or, Y = 3 – (1/6)X

Y = 3 – (1/6)(-12)

Y = 3 + 2 = 5

(X, Y) = ( -12, 5)

1. (Checking your algebra and your recall of slope-intercept form) Suppose you are given the following equation:

X = 2Y – 4

where X is the variable measured on the horizontal axis and Y is the variable measured on the vertical axis. Suppose that something happens so that for every X value in the original equation the Y value is now 10 units larger. What is the equation for this new line? Show all your work in finding this new equation.

Answer:

There are different ways you can solve this problem: one is to draw the original line and then plot a new point that sits on the revised line. The two lines should have the same slope (or, in the case of using the x-intercept form, the same value for the reciprocal of the slope) and then you can substitute in this new point’s coordinates to solve for the new y-intercept. Thus, this equation you have is in x-intercept form and that tells us that the point (-4, 0) sits on the original line. The new line will include the point (-4, 10). So we can rewrite the new equation as X = 2Y +b and plug in (-4, 10) for X and Y respectively: thus, -4 = 2(10) + b or b= -24. The new equation would therefore be X = 2Y – 24.

Alternatively, you could rewrite the original equation in slope-intercept form: Y = 2 – (1/2)X and then use the same slope but increase the y-intercept by 10 units to find the new equation in slope intercept form: Y = 12 – (1/2)X.

Let’s verify that this new equation is the same as the one we found using the first technique: Y = 12 – (1/2)X can be rewritten as (1/2)X = 12 – Y or X = 24 – 2Y. The equations are the same!

1. (Checking your algebra and your recall of slope-intercept form) Suppose you know that the points (10, 4) and (5, 2) sit on the same straight line. Write an equation for this line in slope intercept form given this information. Show all your work in finding this equation.

Answer:

To find the equation for this line start by calculating the slope:

Slope = (change in Y)/(change in X) = (4 – 2)/(10 – 5) = 2/5

Then, use the general slope intercept form and a given point to find the y-intercept:

Y = mX + b

2 = (2/5)(5) + b

b = 0

Y = (2/5)X

1. (Graphical analysis with some algebra) Suppose that you know the points (X, Y) = (8, 16) and (30, 5) sit on the same straight line. Determine whether the following points sit on this line, sit below the line, or sit above the line. Show your work in the large space below and then on the blank state whether the point sits on the line, below the line, or above the line.
   1. (X, Y) = (20, 14) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. (X, Y) = (6, 17) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. (X, Y) = (35, 3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. (X, Y) = (38, 2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answer:

Given the two points we can write the equation for the straight line as Y = 20 – (1/2)X. Then, we can substitute the X value for each of the points given in (a) through (d) to calculate what the Y value is for the point on the line that includes that particular X value. Thus, in (a) Y = 20 – (1/2)(20) or Y = 10. The point on the line is (X, Y) = (20, 10) and not the given point of (20, 14). (20, 14) must sit above the line.

For (b), Y = 20 – (1/2)(6) = 17. When X is equal to 6, then Y is equal to 17. The point (X, Y) = (6, 17) sits on the line.

For (c), Y = 20 – (1/2)(35) = 2.5. When X is equal to 35, then Y is equal to 2.5. The point (X, Y) = (35, 3) sits above the line.

For (d), Y = 20 – (1/2)(38) = 1. When X is equal to 38, then Y is equal to 1. The point (X, Y) = (38, 2) sits above the line.

To recap:

1. Above the line
2. On the line
3. Above the line
4. Above the line
5. (Checking your facility with percentages, decimals, and multiplication) Susie deposits $200 in a savings account at the local credit union. During the first year Susie earns 6% on this savings account. This interest is paid to Susie at the end of the year. Susie keeps the original amount of her deposit plus this savings in her account and during the second year she earns 5% on this account. At the end of the second year what is the value of Susie’s savings account. Show how you found your answer.

Answer:

At the end of the first year Susie has ($200)(1 + 6%) = (200)(1.06) = $212.00

At the end of the second year Susie has ($212)(1 + 5%) = (212)(1.05) = $222.60