MATH106

Quiz 2

***Directions*:**

* Read and sign the academic honesty certification statement below, then read the questions carefully and answer them to the best of your ability. You may write your answers on this sheet or on the sheet you do your work on, but PLEASE show your work. Answers shown without work will get no credit. Work shown with unclear derivations or key steps missing in the derivations of answers will not lead to full credit (even if the answer is correct). Follow directions as outlined in Quizzes folder under the “Assignments” link on our LEO classroom NavBar.
* The completed quiz that you submit/upload must be contained in one file (Word or .pdf format). Uploaded work in other formats or separated over more than one file will not be accepted.
* Test & work is due as specified in “Course Schedule”. I cannot accept any late submissions! This is open-book/notes: calculators, & graphing devices are authorized for use. Good luck!
1. For the equation graphed at left:



 a. Determine the line’s slope *m*:

 *m* = \_\_\_\_\_\_\_\_\_\_\_\_\_

 b. Determine the line’s *y* – intercept:

 \_\_\_\_\_\_\_\_\_\_\_\_\_

 c. State the equation algebraically in *slope – intercept* form:

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. & 3. Solve for the variable. Check your answer in the original equation, if you determine the equation has a single solution. For full credit, **please show all work, including check step!**

2. $6\left(5x-11\right)=12\left(2x+5\right)+18$

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

$$3. \frac{2}{3}y+3 = \frac{3}{4}\left(y+8\right)-4$$

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solve the linear inequality. *Write the solution set* and *graph it on a number line*. If you are typing the quiz, you can easily create a number line and graph inequalities using your keyboard. “How-to” link is in **Content > Course Resources > Webliography** in our LEO classroom.

 $-2<4x+1\leq 17$

**Answer** : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 -4 -3 -2 -1 0 1 2 3 4 5

1. Christina takes her office co-workers to lunch. She gets the $140 bill, adds the gratuity, and as a result charges $170.80 on her credit card. What percent tip did she leave? *Give answer as a percentage rounded to nearest tenth of a percent*.

 Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Multiple Choice:** Find the equation of the line passing through (5, – 2) and ( –1, 7).

*Hint*: *find point-slope or slope-intercept form of equation, then convert that to general form*

 a. 2*x* + 5*y* = 0 b. 2*x* + *y*  = 8 c. 5*x* + 6*y* = 13 d. 3*x* + 2*y* = 11

 Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solve the system of equations using substitution or elimination by addition (your choice). *You MUST show all your work to get credit for this problem*!

$$ 2x-3y=-10$$

$$3x+2y=11$$

 Answer: *x* = \_\_\_\_\_\_\_\_\_\_\_ *y* = \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Your friend tells you he’s being hired at a new job selling electronics. He says he needs to decide which of two different annual pay options he will accept. Option A is a base salary of $20,000 annually plus a 10% commission on his sales. Option B is a base salary of $24,000 annually plus a 6% commission on his sales. Let the variable *x* represent the annual amount of his sales (in dollars), $A(x)$ represent the annual pay function for Option A, and $B(x)$ represent the annual pay function for Option B.

 (i) **Multiple Choice**: The correct function describing annual pay Option A is:

$$A. A\left(x\right)=20000x+0.10 C. A\left(x\right)=20000x+0.10x$$

$$B. A\left(x\right)=20000+0.10x D. A\left(x\right)=20000\left(0.10x\right) $$

 Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) **Multiple Choice**: The correct function describing annual pay Option B is:

$$ A. B\left(x\right)=24000(0.06x) C. B\left(x\right)=24000x+0.06x$$

$$ B. B\left(x\right)=24000x+0.06 D. B\left(x\right)=24000+0.06x $$

 Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iii) Option B delivers a larger annual salary for your friend than Option A does UNLESS your friend’s annual sales *x* are greater than what amount?

 Answer: *x* > \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. As chief financial officer at Amalgamated Pharmaceutical, you track costs and revenue for the daily manufacturing process for your company’s top-selling product, Shovitall™, the drug that relieves math anxiety. Daily production costs $6,300 plus $45 for every case produced. Daily revenue coming in equates to $115 per case sold.
2. Determine the cost (*C*) and revenue (*R*) equations for this manufacturing process. Let *x* represent number of cases.

 Cost equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Revenue equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How many cases must be sold each day for this manufacturing process to break even? *Your answer must be supported either algebraically or graphically – don’t just give an answer!*

 Number of cases sold daily to break even: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The following table lists the amount of money Americans spent on antipsychotic drugs annually from 2004 to 2011 [Source:  IMS Institute for Healthcare Informatics, "Use of Medicines in the United States: Review of 2011"]

|  |  |
| --- | --- |
| Years After 2004(*x*-value) | Billions of Dollars Spent on Antipsychotic Drugs per year(*y*-value) |
| 0 | 8.6 |
| 1 | 9.9 |
| 2 | 11.4 |
| 3 | 12.8 |
| 4 | 14.3 |
| 5 | 14.7 |
| 6 | 16.1 |
| 7 | 18.2 |

1. Draw a scatterplot of the data, AND then graph the linear model equation *on the same graph the scatterplot is on*.

You may graph on graphing paper and scan it, or graph using a calculator and attach an image of the screen, or you may use spreadsheet software and attach the file (free online graphing calculators, tutorials for TI-80 series graphing calculators, and an instructional video on how to build scatterplots and find the linear regression model’s equation using Excel are all available in our LEO classroom at **Content > Course Resources > Webliography**)

1. The linear regression model of this data produces an equation defined as:

$$y=1.3048x+8.6833$$

where *x* represents the number of years after 2004. Use it to predict the annual amount (in billions of dollars) that will be spent in the US on antipsychotic drugs in the year 2024 (*round answer to nearest tenth of a billion dollars*). *Hint: how many years since 2004 is 2024?*

 Predicted 2024 amount spent ($US billions): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. y < −12x + 3

