**Unit V Journal—Chapter 9/Supplements Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Respond to each item, giving sufficient detail. Neatly handwrite your responses. *This should be very helpful to you as you prepare for exams.*



1. Refer to the coordinate grid.

Plot the following points and name their quadrant

(or axis).

A (4, 7) \_\_\_\_\_\_\_

B (-3, -1) \_\_\_\_\_\_\_

C (0, -8) \_\_\_\_\_\_\_

 A **function** describes how a dependent variable changes with respect to one or more independent variables. If the dependent variable (y) is a function of the independent variable (x), we write the function as

y = \_\_\_\_\_\_\_\_\_

The

of a function is the set of values that both make sense and are of

interest for the independent variable.

The **range** of a function consists of the values of the correspond to the values in the domain.

variable that

2. Complete the table with 3 ordered pairs that satisfy this function, and then draw a complete graph.



y = -2x + 7 or 2x + y = 7

|  |  |
| --- | --- |
| x | y |
|  |  |
|  |  |
|  |  |

3. To find the **y-intercept** of a line, I set \_\_\_\_\_\_\_ equal to 0 and then solve for \_\_\_\_\_\_\_ .

To find the **x-intercept** of a line, I set \_\_\_\_\_\_\_ equal to 0 and then solve for \_\_\_\_\_\_\_ .

P.S. These principles work for linear and non-linear functions and relations.

Show how to find the intercepts for the line in #2: 2x + y = 7

4. Describe the meaning of **slope** and how to find it given two points (x1, y1) and

(x2 , y2 ).

Meaning: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Also include the 4 general slope cases along with a drawing for each.

 Write the equation of any line parallel to the graph of . \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Write the equation of any line perpendicular to the graph of y = -3.

 What is the slope of the line in #2. \_\_\_\_\_\_\_

5. Write the 3 forms of **linear equations** along with the meanings of the constants in each formula.

Slope-intercept form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

m: slope b: \_\_\_\_\_\_\_

Standard form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Point-slope form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A, B, C are real numbers

Point: (x1, y1 ) Slope: m

6. For the following linear equation, find the slope, x- and y-intercept. Show your work.

  Slope = \_\_\_\_\_ x-intercept = \_\_\_\_\_ y-intercept = \_\_\_\_\_\_\_\_\_\_

7. An **application** involving linear functions involves the relationship between Celsius and

Fahrenheit temperature measurements. A common formula (in slope-intercept form) is

F = 9 C + 32 . Interpreting the slope and y-intercept of this linear function, if the

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temperature increases 5°C, the temperature increases

°F (interpreting the meaning

of the slope concept), and 0°C =

°F (interpreting the y-intercept concept).

Another application involves uniform motion. Write the linear formula relating distance

(d) and time (t) for a fixed rate of speed, r = 65 mph. d = \_\_\_\_\_\_\_

Another common application involves cost structures. For example, an automobile mechanic may charge $165 for parts and $45 an hour for labor. Write the corresponding formula, with C for cost and t for time in hours. C = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. One of the stages involved in **linear regression** using the TI Plus graphing calculator is entering the data. What set of keystrokes takes you to the L1, L2 lists?

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

 Once you enter the ordered pairs into lists, what set of keystrokes on the calculator takes you to the selection of the x-y scatter plot? Answer: 2nd Y= (STAT PLOT)

Once you make a reasonable WINDOW for your data, the major regression step is the command:

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

The correlation coefficient is given by the symbol \_\_\_\_\_\_\_ and describes the type and

strength of relationship between the dependent variable y and the independent variable x.

If y decreases as x increases, the relationship is negative; if y increases as x increases, the relationship is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

The strength of the relationship is determined by how close | r | is to \_\_\_\_\_\_\_. The correlation coefficient is calculated by the TI Plus when “Diagnostics On” is selected.

9. When checking the quality of a linear model for predictions (whether dealing with a line through the first and last point, a line through any other two points, or the line of best fit), we evaluate using SSE and average error.

 How do you find error?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 What does SSE represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Give the formula for average error.

10. For a **quadratic function**, vertex (or standard) form is y = \_\_\_(x – \_\_\_ )2 + \_\_\_ .

The coordinates of the vertex of the corresponding parabola are . The axis (line) of symmetry is given by the equation .

After setting y equal to 0, what technique is most natural for finding any x-intercepts? Choose from among: factoring/the zero product property, the square root property, completing the square, and the quadratic formula.

How do you find the y-intercept of the parabola? Substitute 0 for \_\_\_\_ and solve.

11. Find the following features of the parabola given by y = -(x + 1)2 + 4. Show work to support the intercepts. Then graph the parabola.



 vertex: \_\_\_\_\_\_\_\_\_\_

 axis of symmetry: \_\_\_\_\_\_\_\_\_\_

 x-intercepts: \_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_

 y-intercept: \_\_\_\_\_\_\_\_\_\_

12. For a quadratic function, the general form is y = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , where a ≠ 0.

Give the general formulas we use to find the vertex of the parabola. h = \_\_\_\_\_\_ , k = f(h) Using this form, the y-intercept is given by the ordered pair .

The axis (line) of symmetry is given by the equation \_\_\_\_\_\_\_\_\_ .

 More about x-intercepts on the next problem . . .

 Bonus (+2): Find the equation of the parabola in the grid above.

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

13. After setting y equal to 0, what two techniques are most natural for finding any x- intercepts? Choose from among: factoring/ the zero product property, the square root property, completing the square, and the quadratic formula.

(1) factoring/zero product property

(2)

Complete the quadratic formula: x = –b ±

 Find the x-intercepts of the following two parabolas, showing 2 of the methods listed above.

 (a) y = x2 + 4x – 5 (b) y = x2 + 4x + 2

14. Graph the parabola given by y = x2 + 4x – 5. Include and clearly label all 4 features.



 vertex: \_\_\_\_\_\_\_\_\_\_

 axis of symmetry: \_\_\_\_\_\_\_

 x-intercepts (from #13a): \_\_\_\_\_\_\_\_\_\_\_\_

 y-intercept: \_\_\_\_\_\_\_

15. Complete the following list of 3 realistic applications of quadratic functions, along with corresponding examples of formulas.

 (1) Projectile Motion (height in feet vs. time in sec) H = -16t2 + 80t + 200

 (2) Area of a Circle (vs. radius) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (3) Quadratic Regression (Roller Coaster Data) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. Write a few sentences describing something you learned that was new for you in class this unit. You may include a favorite activity, an interesting application, a teaching and learning technique, or a specific concept that you better understand as a result of this unit.

17. Now think back over the entire course. Write a few sentences describing something you learned that was new for you in class. You may include a favorite activity, an interesting application, a teaching and learning technique, or a specific concept that you better understand as a result of this course.

 One thing Professor Clement should continue doing is . . .

 One thing Professor Clement should consider changing is . . .

**Do your best! Rise to the challenge! Live and learn!**