Exercise Set 4:   Additional exercises on finding the formula for a line algebraically, and interpreting the slope and intercept.   These problems are examples in two of the review topics in the MATH 1333 materials. Since they are examples, they are completely worked out there.

1. For this formula: $R = -6.3 + 8.2 \cdot d$, tell

    a. Is it linear relationship?

    b. If it is a linear relationship, what is the slope?

    c. If it is a linear relationship, what is the y-intercept?

2. For this formula: $R = -6.3 + 8.2 \cdot d$, find a three points that fit this and use them to sketch a graph.

3. A manager is considering the cost C of printing a book based on the number of pages p. He is told that the formula for predicting the cost is linear based on the number of pages and that the y-intercept is $4.50 and the slope is $0.027. Find the formula to predict the cost from the number of pages.

4. Find the formula for the line with slope 1.35 which has the point (5,40) on it.

5. Find the formula for the line through (2,6) and (4,11).
    Identify the slope and y-intercept.

6. We have been told that the amount of oatmeal needed for oatmeal cookies is linearly related to the amount of flour needed. Also, we know that if we use 3 cups of flour, we need 2 cups of oatmeal. And, of course, if we use 0 cups of flour, we will use 0 cups of oatmeal.

    a. Find the formula to predict the oatmeal needed (called M) from the flour needed (F.)

    b. Interpret the slope.

    c. Interpret the y-intercept.

7. Find the slope and intercept of the line $y = -2.32x + 7.89$

8. Find the slope and intercept of the line $y = 84.4 + 9.2x$

9. Find the slope and intercept of the line $y = 1127 - 93x$

10. Find the slope and the intercept of the line $y = 2178x - 114$

11. Find the formula for the line with slope -6.2 through the point (87.2, 112.7)

12. Find the formula for the line through (8,5) and (13,17)

13. Find the formula for the line through (83.8, 79.9) and (232.7, 63.4)

14. During the first and second quarters of a year, a business had sales of $42,000 and $58,000, respectively. The growth of sales follows a linear pattern for the next four years. Write a linear formula for this growth.

15. Ajax Manufacturing bought a machine for $48,000. It is expected to last 15 years and, at the end of that time, have a salvage value of $7,000. Write a linear formula for the depreciation.

16. When cigarettes are burned, one by-product in the smoke is carbon monoxide. Data is collected to determine whether the carbon monoxide emission can be predicted by the nicotine level of the cigarette. It is determined that the relationship is approximately linear when we predict carbon monoxide, C, from the nicotine level, N. Both variables are measured in milligrams. The formula for the model is $C = 3.0 + 10.3 \cdot N$.

    a. Interpret the slope.

    b. Interpret the intercept.

17. Reinforced concrete buildings have steel frames. One of the main factors affecting the durability of these buildings is carbonation of the concrete (caused by a chemical reaction that changes the pH of the concrete) which then corrodes the steel reinforcing the building. Data is collected on specimens of the core taken from such buildings, where the depth, d, of the carbonation, in mm, and the strength, s, of the concrete, in mega-Pascals (MPa,) are measured. It is found that the model is $s = 24.5 - 2.8 \cdot d$

    a. Interpret the slope.

    b. Interpret the intercept.