

2. A real estate agency has fixed monthly costs associated with rent, staff salaries, utilities and supplies. It earns its money by taking a percentage commission on total real estate sales. During the month of July, the agency had total sales of \$ 832,000 and showed a net income (after paying fixed costs) of \$ 15,704. In August total sales were \$ 326,000 with a net income of only \$ 523.

(a) Use a formula to express net income as a linear function of total sales. Be sure to identify what the letters that you use mean.

(b) Plot the graph of net income and identify the slope and vertical intercept.

(c) What are the real estate agency's fixed monthly costs?

(d) What percentage commission does the agency take on the sale of a home?

(e) Find the horizontal intercept and explain what this number means to the real estate agency.

3. A scientist collected the following data on the speed, in centimeters per second, at which ants ran at the given ambient temperature, in degrees Celsius.

Temperature	25.6	27.5	30.3	30.4	32.2	33.0	33.8
Speed	2.62	3.03	3.57	3.56	4.03	4.17	4.32

- (a) Find the equation of the regression line, giving the speed as a function of temperature.

- (b) Explain in practical terms the meaning of the slope of the regression line.

- (c) Express, using functional notation, the speed at which the ants run when the ambient temperature is 29 degrees Celsius, and then estimate that value.

- (d) The scientist observes the ants running at a speed of 2.5 centimeters per second. What is the ambient temperature?

4. The table below shows the average salaries, in thousands of dollars, of elementary and secondary classroom teachers in public schools in the given year:

Year	Elementary	Secondary
2001	42.9	44.0
2002	44.1	45.2
2003	45.4	46.0
2004	46.4	47.0
2005	47.4	48.0

- (a) Find a regression line for the average salary of an elementary school teacher versus time.

- (b) Find a regression line for the average salary of a secondary school teacher versus time.

- (c) Assuming that the trends will continue, on the basis of these regression lines, when would you expect that the average salary for elementary teachers in public schools will be the same as that for secondary schools?

5. In your garden you have space for 55 small flowering bulbs. Crocus bulbs cost \$ 0.35 each and daffodil bulbs cost \$ 0.75 each. Your budget allows you to spend \$ 25.65 on bulbs.

(a) Let c be the number of crocus bulbs and d the number of daffodil bulbs you can afford. Write two linear equations involving c and d reflecting the data in the statement above.

(b) Use either substitution or elimination to find the number of crocus bulbs and the number of daffodil bulbs that you can buy.