

3.4 Application Problems

1. Jo mows lawns after school. She paid \$300 for a lawnmower and other supplies in order to start her business. She finds that she can use the equation $P = -300 + 15N$ to calculate her profit.
 - a. Define the variables N and P .
 - b. Give possible real-world meanings for the numbers -300 and 15 .
 - c. What is Jo's profit if she mows no lawns?
 - d. How many lawns would Jo have to mow to make \$45 profit?
2. As part of a physics experiment, June threw an object off a cliff and measured how fast it was traveling downward. When the object left June's hand, it was traveling 5 m/s, and it sped up as it fell. The equation for this situation is $s = 5 + 9.8t$.
 - a. Define the variables s and t .
 - b. What are the real-world meanings of the numbers 5 and 9.8 ?
 - c. What was the objects speed after 3 sec?
 - d. If it were possible for the object to fall long enough, how many seconds would pass before it reached a speed of 83.4 m/s?
3. Manny has a part-time job as a waiter. He makes \$45 per day plus tips. He has calculated that his average tip is 12% of the total amount his customers spend on food and beverages. An equation for this situation is $y = 45 + .12x$
 - a. Define the variables x and y .
 - b. What are the real-world meanings of 45 and $.12$?
 - c. What amounts spent on food and beverages will give him a daily income between \$105 and \$120?
4. Paula is cross-training for a triathlon in which she cycles, swims, and runs. Before designing an exercise program for Paula, her coach consults a table listing rates for calories burned in various activities.

Cross-training activity	Calories burned (per min.)
Walking	3.2
Bicycling	3.8
Swimming	6.9
Jogging	7.3

 - a. On Monday, Paula burns 114 calories biking for 30 minutes before she begins to swim. Write an equation for the number of calories that she burns in terms of the number of minutes that she swims. Define your variables.
 - b. On Wednesday, Paula burns 207 calories swimming for 30 minutes before she begins to jog. Write an equation for the number of calories that she burns in terms of the number of minutes that she jogs.
 - c. How many total calories did Paula burn from 4a-b, if she exercised for 60 minutes on both days?