

## MISCELLANEOUS PROBLEMS

1. It is a hot summer day, and Eric the Sheep is at the end of a line of sheep waiting to be shorn. There are 50 sheep in front of Eric. Being an impatient sort of guy, Eric decides to shorten the time it will take for his turn to come. So, every time the shearer takes a sheep from the front of the line to be shorn, Eric sneaks up 2 places in line. How many sheep will be shorn before Eric?
2. A frog climbs up the side of a well and slides back a bit while resting. More specifically, every minute, the frog leaps upward 5 meters (precisely at the end of the minute). Then it rests for one minute. At the end of its rest period, the frog slips back 3 meters. At the end of the next minute, it leaps upward 5 meters, then it slips back 3 meters, and so on. If the well is 11 meters deep, what is the least amount of time needed for the frog to get out? (Note: if there are 5 meters, or less, left at the end, we assume the frog gets out.)
3. A group of students is standing, equally spaced, around a circle. The 43<sup>rd</sup> student is directly opposite the 89<sup>th</sup> student. How many students are in the group?
4. Four neighbors—Chris, Dana, Leslie, Pat—each have a different occupation (accountant, baker, chef, dentist). From the following information, determine the occupation of each neighbor.
  - a. Dana usually gets home from work after the banker but before the dentist.
  - b. Leslie, who is usually the last to get home from work, is not the accountant.
  - c. The dentist and Leslie usually leave for work at the same time.
  - d. The banker lives next door to Pat.
5. Suppose you have 40 feet of fencing with which to make a rectangular pen for your pet rabbit. You want each side to be a whole number of feet long, and you want to make the pen have the largest possible area. What would the length and width of such a pen be, and what is the largest area possible?
6. Achilles, the hare, runs at a constant rate of 9 miles per hour. Achilles is going to race against a tortoise, who moves at only 1 mile per hour. To make the race fair, the tortoise gets a head start of 32 miles.
  - a. Write an equation describing the relationship between the distance Achilles covers and the time he runs.
  - b. Write an equation describing the relationship between distance and time for the tortoise.
  - c. How long will it take for Achilles to catch up to the tortoise?

7. On Monday, the produce manager of a local supermarket stocked his store's display case with 80 heads of lettuce. By the end of the day, some heads of lettuce had been sold. On Tuesday, the manager counted the number of heads of lettuce that were left and decided to add an equal number of heads of lettuce, thereby doubling the leftovers. By the end of the day on Tuesday, he had sold the same number of heads of lettuce as on Monday.

On Wednesday, the manager decided to triple the number of heads of lettuce that had been left in the case. He sold the same number of heads of lettuce that day, too. At the end of the day, though, there were no heads of lettuce left.

How many were sold each day?

#### 8. Belt Around the Equator

Imagine a belt fit snugly around the equator. If the belt is then cut and an additional 10 feet is added, the belt will no longer fit snugly. There will be some slack. If the slack is distributed evenly around the Earth, how much of a gap will be created between the belt and the Earth? Could you slip a piece of paper under the belt? Your hand? Your body?

#### 9. Watermelon Picnic

Suppose at a school picnic, you have 100 pounds of cut-up watermelon sitting in the sun on a hot day. The watermelon is 99% water and 1% "other", or in other words, 99 pounds of water and 1 pound of "other". As the watermelon sits in the sun, some of the water evaporates. How much does the remaining watermelon weigh when it is 98% water?

#### ANSWERS

1. 17 sheep

2. 7 minutes

3. 92 students

4. Banker is Chris, Accountant is Dana, Chef is Leslie, Dentist is Pat

5. 10 ft by 10 ft, maximum area is 100 square feet

6. a.  $D = 9T$    b.  $D = 1T + 32$    c. 4 hours

7. 48 sold each day

8. 1.6 feet

9. 50 pounds