1 Converting Units

Problem 1. If we want to convert 25 meters into yards, we can perform the following computation:

\[
25 \text{m} \cdot \frac{100 \text{cm}}{1 \text{m}} \cdot \frac{1 \text{in}}{2.54 \text{cm}} \cdot \frac{1 \text{ft}}{12 \text{in}} \cdot \frac{1 \text{yd}}{3 \text{ft}} \approx 27.3 \text{yds.}
\]

1. In this method, we multiplied the original measurement by several fractions. How were these fractions chosen?

2. Explain why this technique works. In other words, why does this tell us that 25 meters is really equal to 27.3 yards? What is special about the fractions we multiplied by that allows this to work?

3. Describe another method for converting this measurement, and discuss how it compares to this technique.

4. Use this technique to convert 1 mile to kilometers, using the fact that 1in = 2.54cm.

5. Use this technique to convert 4.5 gallons to pints and then to cups.

2 The Triangle Inequality

Problem 2. Consider the triangle above. Does anything seem odd about it? Determine what is wrong with the diagram, and discuss at least two ways to fix the problem.
**Problem 3.** The previous problem suggests that the possible side lengths of triangles are somehow restricted. If you know that a triangle has one side of length 5in and another side of length 9in, then what are the possible lengths of the third side? (Remember that the length of the remaining side does not have to be a whole number of inches.)

**Problem 4.** Can you give a full description of the requirements for the side lengths of a triangle? In other words, if a triangle has side lengths $a$, $b$, and $c$, what can you say about the numbers $a$, $b$, and $c$?

### 3 Definitions

Study the following definitions from your textbook before the next class:

1. Angle
2. Right angle
3. Straight angle
4. degree
5. Acute
6. Obtuse
7. Reflex angle
8. Congruent (for angles)
9. Bisector
10. Supplementary angles
11. Complementary angles