

Skill Drill 3

This drill provides practice in translating word statements into equations and diagrams. Skillful reading is as important in problem solving as mathematical manipulation. Frequently check your work against the suggested solutions.

1. Translate the following English sentences into algebraic statements (equations), using symbols of your choosing where necessary. You do not need to algebraically simplify the equations.

(a) Charles is 18 years older than Morgan.

(b) My uncle is twice as old as your brother.

(c) John is 10 years older than Moe was 3 years ago.

(d) Ten *months* ago, Maggie was 18 years old.

(e) A British pound is three times as valuable as a German deutschemark.

(f) The temperature expressed in degrees Kelvin is 273.1 degrees greater than the temperature expressed in degrees Celcius.

(g) The average x_{av} of x_1 , x_2 , and x_3 is the sum of these quantities divided by three.

(h) The "root mean square" average x_{rms} of x_1 , x_2 , and x_3 is the square root of one-third of the sum of the squares of these quantities.

(i) The density ρ of an object is defined as the mass of the object divided by the volume.

2. The airport bus takes in as fares an average of D dollars per trip. It carries two children for every three adults, and carries an average of N adults per trip. The adult ticket fare is A dollars and the child's fare is half that. Write an equation which relates D , N , and A .

3. With B buses per hour each with 50 passengers, the bus lane carries twice as many commuters per hour into the city as do the car lanes with C cars per hour with an average of 3 passengers per car. Relate B and C through an equation.

4. Solve each of these problems by representing the data as a diagram:

(a) Josephine is shorter than Mary but taller than Gert. Who is tallest and who is shortest?

(b) If I were as rich as Carl I'd be twice as rich as Bob and three times as rich as John. Who is richer, Bob or John? How much richer?

(c) In language school for diplomats the most difficult languages require the longest period of training. French requires one-third as much time as Arabic, while Spanish requires one-third as much time as German, which in turn requires half as much time as Arabic. Which requires more training, French or German? -French or Spanish?

5. In a certain part of town numbered avenues run north-south whereas lettered streets run east-west. Use a "map-like" diagram to answer the following questions:

(a) Broadway crosses A-Street at a right angle. Is Broadway perpendicular or parallel to 3rd Avenue?

(b) Joe leaves his apartment at 4th Avenue and F-Street going north 2 blocks to H-Street and then east three blocks to 7th Avenue. He then goes south 5 blocks and west 6 blocks. Near what intersection does he end up?

(c) In what general direction does his apartment lie — NE, NW, SW, or SE?

6. An airplane sets out on a course which is due north and flies 100 miles. It then makes a left turn to the northwest and flies another 100 miles.

(a) Make an appropriate sketch.

(b) To go directly to its starting point should it make a left or right turn?

7. Draw a very simple sketch to illustrate each of the following situations:

(a) A ladder leaning against a wall (side view).

(b) A box resting on an incline.

(c) A ball rolling down an incline.