

Different Forms of Equations for Lines

We can write equations of lines in the following forms:

- $y = mx + b$, where m and b are constants
- $y - b = m(x - a)$, where m , a , and b are constants
- $ax + by = c$, where a , b , and c are constants

Each form is “natural” or “readily formulated” in certain situations.

1. (a) Which lines can be described by an equation of the third type but not by an equation of the first two types?

(b) What information about a line can you deduce immediately from an equation of the second form? Why?

(c) When is the first form easiest to formulate?
2. For each of the following situations, formulate an appropriate equation that arises from the situation. Use the “most readily formulated” of the three forms for the situation. In each case, define your variables (you may use x and y or other letters but be sure to say what they stand for).
 - (a) You are buying fence and having it delivered. For 25 feet of fence, the total cost, including delivery, is \$300. Each additional foot of fence will cost you an additional \$10.
 - (b) You are buying fence and having it delivered. The delivery fee is \$50. Each foot of fence costs \$10.
 - (c) You are buying fence and having it delivered. For 25 feet of fence, the total cost, including delivery, is \$300. For 35 feet of fence, the total cost, including delivery, is \$400.
 - (d) You have 25 feet of fence that you will use to form two adjacent sides of a rectangular dog pen. The other two sides will be formed by part of a long L-shaped wall. What are the possible lengths and widths of the dog pen?
 - (e) If 50 raffle tickets are sold, the school’s fall festival will break even. The school will make \$1.50 for each additional raffle ticket that is sold.
 - (f) A grocer will spend \$50 on broccoli and cauliflower combined. Broccoli costs \$0.50 per head and cauliflower costs \$0.60 per head.