Written Exercises

If a value of π is required in the following exercises, use $\pi \approx 3.14$.

A

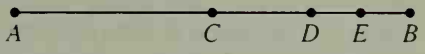
1. M is the midpoint of $\overline{AB}$ and Q is the midpoint of $\overline{MB}$. If a point of $\overline{AB}$ is picked at random, what is the probability that the point is on $\overline{MQ}$? (*Hint*: Make a sketch.)

2. In the diagram, $AC = CB$, $CD = DB$, and $DE = EB$. If a point X is selected at random from $\overline{AB}$, what is the probability that:

a. X is between A and C?

b. X is between D and B?

c. X is between C and E?



3. A friend promises to call you at home sometime between 3 P.M. and 4 P.M. At 2:45 P.M. you must leave your house unexpectedly for half an hour. What is the probability you miss the first call?

4. **a.** At a subway stop, a train arrives every six minutes, waits one minute, and then leaves. If you arrive at a random time, what is the probability there will be a train waiting?

b. If you arrive and there is no train waiting, what is the probability that you will wait no more than two minutes before one arrives?

5. A circular dartboard has diameter 40 cm. Its bull's eye has diameter 8 cm.

a. If an amateur throws a dart and it hits the board, what is the probability that the dart hits the bull's eye?

b. After many throws, 75 darts have hit the target. Estimate the number hitting the bull's eye.

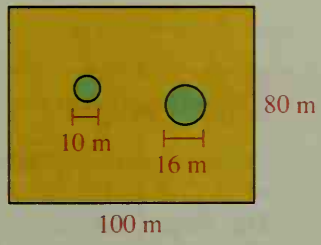
6. Several hundred darts are thrown at the square dartboard shown. About what percentage of those hitting the board will land in the location described?

a. Inside the inner square

b. Outside the inner square but inside the circle

7. A dart is thrown at a board 12 m long and 5 m wide. Attached to the board are 30 balloons, each with radius 10 cm. Assuming each balloon lies entirely on the board, find the probability that a dart that hits the board will also hit a balloon.

8. Parachutists jump from an airplane and land in the rectangular field shown. What is the probability that a parachutist avoids the two trees represented by circles in the diagram? (Assume that the person is unable to control the landing point.)



9. Refer to Example 3. Suppose that a quarter, instead of a dime, is tossed and lands on the table shown on the preceding page. What is the probability of winning on one toss? (The radius of a quarter is 12 mm.)