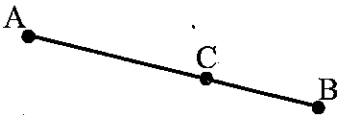
11-8 Geometric Probability

$$\text{Probability of an event} = \frac{\text{Favorable Outcomes}}{\text{Total Outcomes}}$$

For the problems in this section you will need one of the following:

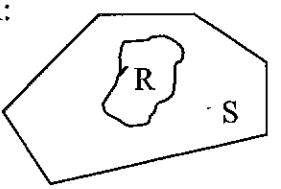
1.) Point P on $\overline{AB}$ picked at random, then:

$$\text{probability that P is on } \overline{AC} = \frac{\text{Lenth of } \overline{AC}}{\text{Length of } \overline{AB}}$$

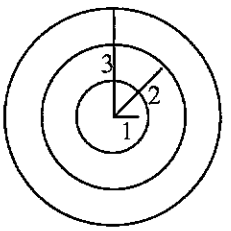


2.) Suppose a point P of Region S is picked at random. Then:

$$\text{probability that P is in region R} = \frac{\text{area of R}}{\text{area of S}}$$



3) What is the probability that an arrow will hit the bull's eye of the target below?



$A_{bulls} = \pi(1)^2 = \pi$

$A_{big\,O} = \pi(3)^2 = 9\pi$

$\frac{\pi}{9\pi} = \frac{1}{9}$

4) At a carnival game, dishes are positioned on a table so that they do not overlap. You win a prize if you throw a nickel that lands on a dish. If the area of the table is 1.5 m^2 and the area of the dishes combined is 1 m^2, what is the probability that the nickel will NOT land in a dish?

$\frac{.5}{1.5} = \frac{1}{2} \cdot \frac{2}{3} = \frac{1}{3}$

5) A friend promises to call you sometime between 4:00 and 4:30pm. At 4:10pm you realize your cell phone was turned off. What is the probability that you missed your friend's phone call?

$\frac{10\text{min}}{30\text{min}} = \frac{1}{3}$

6) A different commuter train stops at a certain station every 20 minutes. The length of time each train stands at rest at the station is 3 minutes.

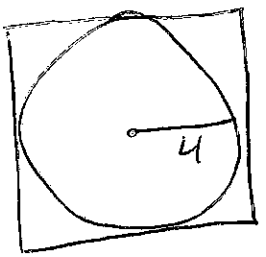
a) If you arrive at a random time, what is the probability you will be able to board the train as soon as you arrive?

$\frac{3}{20}$

b) If you arrive at the station and there is no train waiting, what is the probability that your wait will not exceed 10 minutes?

$\frac{10}{17}$

7) A circle is inscribed in a square with side length of 8 inches. What is the probability that a random point is chosen inside the circle?



$A_{\square} = 8^2$
$= 64 \text{ in}^2$

$A_{\bigcirc} = \pi (4)^2$
$= 16\pi \text{ in}^2$

$\frac{16\pi}{64} = \frac{\pi}{4}$

$\approx .785$