Probability Assignment 4

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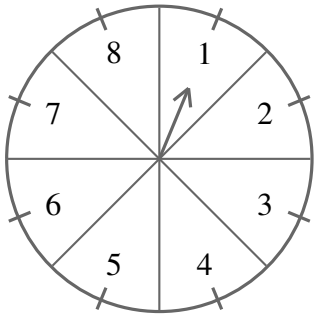
1 Problem statement

A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see figure), and these are equally likely outcomes. What is the probability that it will point at:

1) 8?
2) an odd number?
3) a number greater than 2?
4) a number less than 9?



2 Answer

Let X be the random variable representing the number of successful outcomes in n = 1 trial, and let p be the probability of success for each trial. Since there are 8 possible outcomes and they are equally likely, we have p = 1/8 and X = 1 everywhere as only one trial was allowed

1) $\Pr(8)$:

$$\Pr(X=1) = {}^{1}C_{1}\left(\frac{1}{8}\right)^{1}\left(\frac{7}{8}\right)^{0} \tag{1}$$

$$= \frac{1}{8} \tag{2}$$

2) $\Pr(\text{Odd numbers})$:

$$\Pr(X=1) = {}^{1}C_{1}\left(\frac{4}{8}\right)^{1}\left(\frac{4}{8}\right)^{0} \tag{3}$$

$$= \frac{4}{8} \tag{4}$$

3) $\Pr(\text{Number} > 2)$:

$$\Pr(X=1) = {}^{1}C_{1}\left(\frac{6}{8}\right)^{1}\left(\frac{2}{8}\right)^{0} \tag{5}$$

$$= \frac{3}{4} \tag{6}$$

4) $\Pr(\text{Number} < 9)$:

$$\Pr(X=1) = {}^{1}C_{1}\left(\frac{8}{8}\right)^{1}\left(\frac{0}{8}\right)^{0} \tag{7}$$

$$= \frac{8}{8} = 1 \tag{8}$$