Interpretations of probability

2-51. The sample space of a random experiment is $\{a, b, c, d, e\}$ with probabilities 0.1, 0.1, 0.2, 0.4, and 0.2, respectively. Let A denote the event $\{a, b, c\}$, and let B denote the event $\{c, d, e\}$. Determine the following:

(a) $P(A)$ (b) $P(B)$

(c) $P(A')$ (d) $P(A \cup B)$

(e) $P(A \cap B)$

a) $= 0.4$ b) $= 0.8$ c) $= 0.6$

d) $= 1$ e) $= 0.2$

2-53. If the last digit of a weight measurement is equally likely to be any of the digits 0 through 9,

(a) What is the probability that the last digit is 0?

a) $= 1/10$ b) $= 5/10$

(b) What is the probability that the last digit is greater than or equal to 5?

equal

2-55. An injection-molded part is equally likely to be obtained from any one of the eight cavities on a mold.

(a) What is the sample space?

(b) What is the probability a part is from cavity 1 or 2?

(c) What is the probability that a part is neither from cavity 3 nor 4?

a) $S = \{1, 2, 3, 4, 5, 6, 7, 8\}$

b) $= 2/8$ c) $= 6/8$

In a NiCd battery, a fully charged cell is composed of Nickelic Hydroxide. Nickel is an element that has multiple oxidation states that is usually found in the following states:

nickel charge	proportions found
0	0.17
+2	0.35
+3	0.33
+4	0.15

a) $= 0.83$ b) $= 0.85$

(a) What is the probability that a cell has at least one of the positive nickel charged options?

(b) What is the probability that a cell is not composed of a positive nickel charge greater than +3?

Suppose your vehicle is licensed in a state that issues license plates that consist of three digits (between 0 and 9) followed by three letters (between A and Z). If a license number is selected randomly, what is the probability that yours is the one selected?

$(1/10^3) \times (1/26)^3 = 5.7 \times 10^{-8}$