

Important Problems from Section 4.4

- 1) A test with 9 multiple choice questions (4 choices each) . What is the probability of getting 5 correct?

- 2) A die is rolled 8 times and success is when it comes up 2. Find the probability of getting:
 - a) at least 7 successes
 - b) at least 1 success
 - c) at most 7 successes
 - d) exactly 3 successes
 - e) at most 1 success

- 3) A family with 5 children with probability for boys is 0.6. Find the probability:
 - a) at least 2 boys
 - b) exactly 2 boys
 - c) more boys than girls

- 4) A fair die is rolled 10 times. What is the probability of getting a number larger than 4 exactly 6 times?

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$$\#1) \quad n=9, \quad P(c) = \frac{1}{4}, \quad P(w) = \frac{3}{4}$$

$$P(\text{5 correct}) = C(9,5) \left(\frac{1}{4}\right)^5 \cdot \left(\frac{3}{4}\right)^4$$

$$\#2) \quad P(\text{getting 2}) = \frac{1}{6}, \quad q = \frac{5}{6}, \quad n=8$$

$$\begin{aligned} \text{a) } P(\text{at least 7 } \$) &= 7 \text{ or } 8 \\ &= C(8,7) \cdot \left(\frac{1}{6}\right)^7 \left(\frac{5}{6}\right)^1 + C(8,8) \left(\frac{1}{6}\right)^8 \left(\frac{5}{6}\right)^0 \end{aligned}$$

$$\begin{aligned} \text{b) } P(\text{at least 1 } \$) &= \text{all} - \phi \$ \\ &= 1 - C(8,0) \left(\frac{1}{6}\right)^0 \left(\frac{5}{6}\right)^8 \end{aligned}$$

$$\begin{aligned} \text{c) } P(\text{at Most 7 } \$) &= 7 \$ \text{ or less} \\ &= \text{all} - 8 \$ \\ &= 1 - C(8,8) \left(\frac{1}{6}\right)^8 \left(\frac{5}{6}\right)^0 \end{aligned}$$

$$\begin{aligned} \text{d) } P(\text{Exactly 3 } \$) \\ &= C(8,3) \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^5 \end{aligned}$$

$$\begin{aligned} \text{e) } P(\text{at Most 1 } \$) &= 1 \$ \text{ or less} \\ &= \phi \$ \text{ or } 1 \$ \\ &= C(8,0) \left(\frac{1}{6}\right)^0 \left(\frac{5}{6}\right)^8 + C(8,1) \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^7 \end{aligned}$$

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#3) $n = 5$, $P(\text{boy}) = 0.6$, $P(\text{Girl}) = 0.4$

a) $P(\text{at least 2 B}) = \text{all} - \phi B - 1B$
 $= 1 - C(5,0)(0.6)^0(0.4)^5 - C(5,1)(0.6)^1(0.4)^4$

b) $P(\text{exactly 2 B}) = C(5,2)(0.6)^2(0.4)^3$

c) $P(\text{More Boys}) = 3B \text{ or } 4B \text{ or } 5B$
 $= C(5,3)(0.6)^3(0.4)^2 + C(5,4)(0.6)^4(0.4)^1 + C(5,5)(0.6)^5(0.4)^0$

#4) $n = 10$ $P(\text{larger than 4}) = \frac{2}{6} = \frac{1}{3}$

$q = \frac{2}{3}$

$P = C(10,6) \cdot \left(\frac{1}{3}\right)^6 \left(\frac{2}{3}\right)^4$