M118
FALL 2000

# QUIZ 9

NAME: _____

1) In a certain neighborhood, there is a 20% chance that any given house will give out Snickers bars for Halloween, and there is an 80% chance of not getting a Snickers bar*. Ursula goes to 7 different houses in this neighborhood and gets candy. You may leave your answers below with the arithmetic undone. For example, $1 - 324(.7)^9(.3)^{14}$ is a viable although incorrect answer. $C(6,2)\cdot(.3)^5(.7)^8$ would not be a viable answer.

a) (20 PTS.) What is the probability that she got exactly 4 snickers bars?

$$\binom{7}{4}(.2)^4(.8)^3 = \frac{7\cdot 6\cdot 5}{3!}(.2)^4(.8)^3$$

$$= 35(.2)^4(.8)^3$$

Answer: $Pr[(4\ Snickers)] = 35(.2)^4(.8)^3$

b) (15 PTS.) What is the probability that she got at least two Snickers bars?

$$Pr(\text{at least 2}) = 1 - (Pr(0\ \text{Snickers}) + Pr(1\ \text{Snickers}))$$

$$= 1 - \left((.8)^7 + 7(.8)^6(.2)^1\right)$$

Answer: $Pr[\text{at least two}] = 1-\left((.8)^7+7(.8)^6(.2)^1\right)$

c) (15 PTS.) Given that the first 2 houses visited gave Ursula Snickers bars, what is the probability that she got exactly 3 Snickers bars?

S S _ _ _ _ _ (NEED 1S + 4NS)

$$Pr(1S+4NS) = C(5,1)(.2)^1(.8)^4$$

$$= 5(.2)(.8)^4$$

Answer: $Pr[\text{exactly 3 given } \cancel{\text{at least 2}}\ \text{first 2}] = 5(.2)(.8)^4$

*The type of candy given out by one house is independent of that given out by the others. The probability of getting Snickers bar at any one house is .20.