DAWSON COLLEGE

In-class Assignment #4 (2.5% of final grade)

Introduction to Statistical Methods (201-922-DW)
(Laboratory Technology – Analytical Chemistry)
October 5, 2015
Instructor: Émilie Richer

[Question 1] A student guesses at each of the 5 questions on a multiple choice quiz. Each answer has 5 choices (1 correct, 4 incorrect). Let X = # of correct answers on the quiz.

a. Give a probability distribution table for the random variable X

X	P(X)	Calculations
0	0.328	${}_5C_0 \left(\frac{1}{5}\right)^0 \left(\frac{4}{5}\right)^5$
1	0.4096	${}_5C_1 \left(\frac{1}{5}\right)^1 \left(\frac{4}{5}\right)^4$
2	0.2048	${}_5C_2 \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)^3$
3	0.0512	${}_5C_3 \left(\frac{1}{5}\right)^3 \left(\frac{4}{5}\right)^2$
4	0.0064	${}_5C_4 \left(\frac{1}{5}\right)^4 \left(\frac{4}{5}\right)^1$
5	0.00032	${}_5C_5 \left(\frac{1}{5}\right)^5 \left(\frac{1}{5}\right)^0$

b. Give a mathematical formula for the probability of X

c. Compute μ and σ^2

d. Find the probability of passing the quiz

b. $P(x) = {}_5C_x \left(\frac{1}{5}\right)^x \left(\frac{4}{5}\right)^{5-x}$ FOR $x = 0, 1, 2, 3, 4, 5$

c. $\mu = \sum_{\text{all } x} x\,P(x) = 0(0.328) + 1(0.4096) + 2(0.2048) + 3(0.0512) + 4(0.0064) + 5(0.00032)$

$= 1$

$\sigma^2 = \sum_{\text{all } x} (x-\mu)^2 P(x) = (0-1)^2(0.328) + (1-1)^2(0.4096) + (2-1)^2(0.2048) + (3-1)^2(0.0512) + (4-1)^2(0.0064) + (5-1)^2(0.00032)$

$= 0.8$

Student Name: SOLUTIONS

d. $P(\text{PASSING}) = P(x \geq 3) = 0.0512 + 0.0064 + 0.00032$

$= 0.05792$