Homework 6

Problem 1. The IQ scores for a sample of 24 students who are entering their first year of high school are:

IQ range interval	Number of students	Relative frequency	Cumulative relative frequency
96-102	2		
103-109	3		
110-116	3		
117-123	4		
124-130	5		
131-137	1		
138-144	4		
145-151	1		
152-158	1		

(a) Determine the relative frequency (empirical PMF) and the cumulative relative frequency (empirical CDF).
(b) Determine the average value of the IQ for the sample of students.
(c) What is the probability that an arbitrary student has an IQ greater than 145 (determined based on the empirical statistics determined above)?

IQ range interval	Number of students	Relative frequency	Cumulative relative frequency	U
96-102	2	0.083333333	0.083333333	99
103-109	3	0.125	0.208333333	106
110-116	3	0.125	0.333333333	113
117-123	4	0.166666667	0.5	120
124-130	5	0.208333333	0.708333333	127
131-137	1	0.041666667	0.75	134
138-144	4	0.166666667	0.916666667	141
145-151	1	0.041666667	0.958333333	148
152-158	1	0.041666667	1	155

Mean	123.7916667
Prob > 145	0.083333333

Problem 2. An oil company, has determined that the probability of striking oil on any particular drilling is 0.2.

(a) Accordingly, what is the probability that it would drill 4 dry wells before striking oil on the fifth drilling? Hint: when determining the corresponding PMF, assume that the company continues to drill until success, then stops.

(b) Assuming now that the company already has drilled 10 times, what is the probability that ½ of this times it was successful (and consequently found oil)?

A
P(X=5) = (0.2)*(1 - 0.2)^4
0.08192
B
P(X=5) = [9 choose 4]*((0.2)^5)*((1-0.2)^5)
0.013212058