Binomial

Thursday, June 22, 2023 7:30 PM

In a typical Month, an Insurance agent presents life insurance plans to 40 potential customers. Historically, one in four such customers chooses to buy Life Insurance from this agent. Based on the relevant binomial distribution , answer the following questions :

1. What is the probability that exactly 5 customers will buy life Insurance from this agent in the coming month ?

X : no. of customers who will buy the insurance

p = 0.25, q = 0.75, n = 40

P(X = 5)

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binom.pmf(5, 40, 0.25)
0.0272317427532459 48
```

2. What is the probability that not more than 10 customers will buy life insurance from this agent in the coming month ?

P(X<=10)

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binom.cdf(10, 40, 0.25)
0.5839040780287896
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3. What is the probability that at least 20 customers will buy life insurance from this agent in the coming month ?

P(X>=20) = P(X>19)

```
binom.sf(19, 40, 0.25)
0.0005724311071761386

1 - binom.cdf(19, 40, 0.25)
0.0005724311071760857
```

4. Determine the mean and variance of the number of customers who will buy life insurance from this agent in the coming month.

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binom.stats(40, 0.25)
(10.0, 7.5)
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28. If a cell phone company conducted a telemarketing campaign to generate new clients and the probability of successfully gaining a new customer was 0.07, what is the probability that contacting 50 potential customers would result in at least 5 new customers?

p = 0.07, n =50
P(X>4)

```
binom.sf(4, 50, 0.07)
0.27097309000112557
```

1. An airline estimates that 94% of people booked on their flights actually show up. If the airline books 71 people for a flight of which the maximum number of seats is 69, what is the probability that the number of people who show up will exceed the capacity of the plane? Assume Binomial Distribution for the number of flights staying booked.

p = 0.94, n = 71
P(X>69)

```
binom.sf(69,71,0.94)
0.06838377878951435
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2. The prevalence of a disorder in a certain group of people is 35%. If 20 people from that group are chosen at random, what is the probability that:
   a) None of them have that disorder
   b) 10 of them have that disorder
   c) At most 10 of them have that disorder
   d) At least 14 of them have that disorder

2. A student is applying for Masters course in 8 US Universities and believes that she has in each of the eight universities a constant and independent 0.42 probability of getting selected. Write code to answer the following questions:
(a) What is the probability that she will get call from at least 3 universities?
(b) What is the probability that she will get calls from exactly 4 universities?