Programe : MBA(90)
Course : Quantitative Techniques for manager
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Question # 4:

Solution:

Eight Months = $\frac{2}{3}$ year 30

$$P\left(x < \frac{2}{3}\right) = \int_0^{\frac{2}{3}} \frac{3}{4} x(2-x)\,dx$$

$$= \frac{3}{4} \int_0^{\frac{2}{3}} (2x - x^3)\,dx$$

$$= \frac{3}{4} \left(x^2 - \frac{x^3}{3}\right)_0^{\frac{2}{3}}$$

$$= \frac{3}{4} \left(\frac{4}{9} - \frac{8}{81}\right) - [0]$$

$$= \frac{3}{4} \left[\frac{28}{8}\right] = \frac{7}{27} \approx 0.259$$

Hence expected number of the babies under 8 months

$$= 45 \times \frac{7}{27}$$

$$\boxed{= 11.6}$$

Question #3.

Part a

Differentiate between z-test, t-test & ANOVA test.

Answer:

z-Test:

z-test is a statistical test that is used to determine whether two population means are different when the variance are known and the sample size is large. The test statistic is assumed to have a normal distribution and nuisance parameter, such as standard deviation should be known in order for an accuate z-test to be conduct.

A z statistic is a number representing how many standard deviation above or below the mean population a score devided f z-test is.

where as,

T-test are helpful with a smaller sample size, both the method assume a normal distribution of the data.

Then,

ANOVA test is used to compare means between two or more groups of predic for vesriables.

So, for two groups we can use both t-test and ANOVA and the

result would be the same

3-Part#b

Basic assumption of Chi-Square test

Answer:

Chi-Square test:

It is one of the most useful statistic for testing hypothesis when variables are normal as often happens in clinical research.

Assumptions of Chi-Square Test:

The assumptions of Chi-Square test includes

1) Data in the cells should be frequencies or count of cases, rather than percentage or some other transformation data.
2) However the data maybe ordinal data interval or ratio data that have been collapsed into ordinal categories may also be used.
3) While Chi-Square has no rule about limiting, the number of cells by limiting the number of categories of each variables.
4) Each subject may contribute data one and only one cell in the x^2. If for example the same subject are tested over time, such that the comparison are of the same subject at time 1, Time 2 and Time 3.

Question # 2
Part # A

Assumption of Bionomial Distribution:

Some Assumptions of Bionomial distribution are:

1) There are fix number of trial (represented by the variable n).
2) Each trial has 2 outcomes. (called "success and failure")
3) Trial are all independent of one another.
4) The probability of success is the same trial (the probability is represented by p and q, represented the probability of failure, the opposite of success.

2 - Part b (i)

Binomial Distribution:

$n = 8$, $x = 5$.

formula:

$n = 8$, $P = 3/4$, $q = 1 - 3/4 \Rightarrow 1/4$

$x = 5$

$P(5 \text{ successess}) = {}_8C_5 (3/4)^5 (1/4)^{8-5}$

$\Rightarrow \frac{8!}{(8-5)!5!} (3/4)^5 (1/4)^3$

$= \frac{40320}{120} (0.15)^5 (0.2)^3$

(5)

$(336)(0.237)(0.008)$

$\boxed{P \approx 0.63}$

2 Part # b (ii)

Atleast one success

$n = 8 \quad , x = 1$

$\Rightarrow {}^{8}C_{1} (3/4)^{1} (1/4)^{8-1}$

$= \frac{8!}{(8-1)!1!} (3/4)(1/4)^{7}$

$= \frac{40320}{5040} (0.75)(0.2)^{7}$

$= (8)(0.75)(0.0000128)$

$\boxed{P \approx 0.0000768}$

Question # 1.

Solution

	O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
Goal	1	2	3	4	Total
	14	34	71	128	247
Pop	14	29	35	63	141
sport	6	12	26	46	90
total	34	75	132	237	478
	1	2	3	4	
	17.86	38.75	68.209	122.46	
	10.029	22.12	38.93	69.91	
	6.401	14.121	24.85	44.62	

PTO

(b)

Observed value	Expected value	O-E	$(O-E)^2$	$\frac{(O-E)^2}{E}$
14	17.56	-3.56	1267	0.705
34	38.75	-4.75	22.56	0.582
71	68.20	2.8	7.84	0.114
128	122.46	5.54	30.69	0.250
14	10.029	3.971	15.76	1.571
29	22.12	6.88	47.33	2.139
35	38.93	-3.93	15.44	0.396
63	69.91	-6.91	47.74	0.682
6	6.401	-0.401	0.160	0.024
12	14.121	-2.121	4.498	0.318
26	24.85	-2.85	8.1225	0.326
46	44.62	-1.38	1.90	0.042

$\Sigma \frac{(O-E)^2}{E}$

$x^2 = 6.828$

degree of freedom = (colum-1)(row1)

$(4-1)(3-1) = 3 \times 2 = 6$

Significance count. 0.05

Tabular value is 12.59

x^2 tabular = 12.59

x^2 calculated = 6.828

x^2 calculated < x^2 tabular