SHARE ONLINE REVISION

General Certificate of Education Advanced Level

STATISTICS **6046/1**

PAPER 1

SOLUTION

REVISION TEST 1 2022 SESSION 3 hours

Additional materials:
- Answer paper
- Graph paper
- List of formulae MF7
- Electronic calculator (Non-programmable)

Time 3 hours

INSTRUCTIONS TO CANDIDATES

Write your name in the spaces provided on the answer sheet/answer booklet.

Answer ***all*** questions.

If a numerical answer cannot be given exactly, and the accuracy required is not specified in the question, then in the case of an angle it should be given correct to the nearest degree, and in other cases it should be given to 2 significant figures.

INFORMATION TO CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part of question.

The total number of marks for this paper is 120.

The use of a scientific calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

This question paper consists of 7 printed pages and 1 blank page.

1. In a computer game played by a single player, the player has to find, within a fixed time, the path through a maze shown on the computer screen. On the first occasion that a particular player plays the game, the computer shows a simple maze, and the probability that the player succeeds in finding the path in the time allowed is 0.75. On subsequent occasions, the maze shown depends on the previous game. If the player succeeded on the previous occasion, the next maze is harder, and the probability that the player succeeds is one half of the probability of success on the previous occasion. If the player failed on the previous occasion, a simple maze is shown and the probability of the player succeeding is again 0.75.

   The player plays three games.

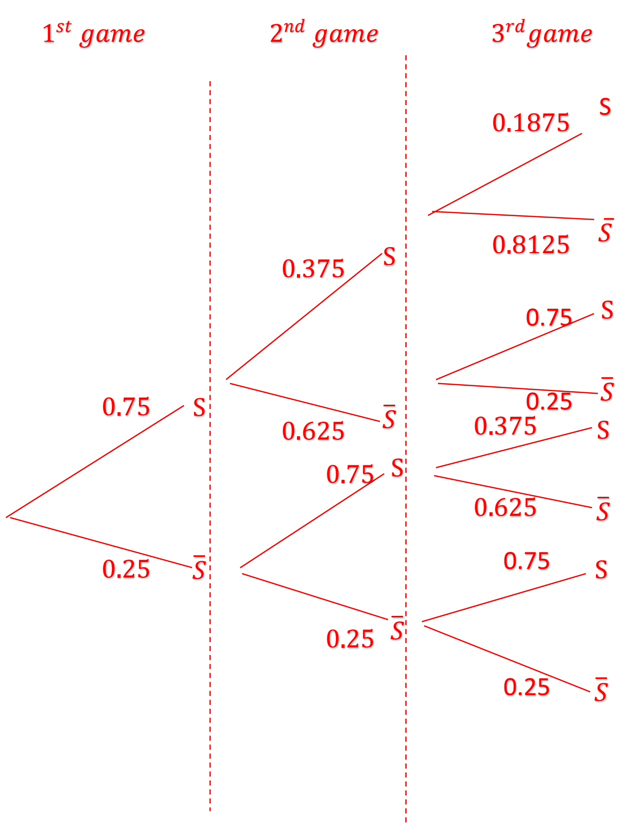
   a) Show that the probability that the player succeeds in all three games is $\frac{27}{512}$. [4]

   b) Find the probability that the player succeeds in exactly one of the games. [3]

   c) Find the probability that the player does not have two consecutive successes. [3]

   d) Find the conditional probability that the player has two consecutive success given that the player has exactly two successes. [3]

SOLUTION



a) $\text{P(player succeeds in all three games)} = \text{P(SSS)}$

$= (0.75 \times 0.375 \times 0.1875)$

$= \frac{\mathbf{27}}{\mathbf{512}}\,(\textbf{shown})$

b) $\text{P(player succeeds in exactly one of the games)} = \text{P}(S\bar{S}\bar{S}) + \text{P}(\bar{S}S\bar{S}) + \text{P}(\bar{S}\bar{S}S)$

$= \{(0.75 \times 0.625 \times 0.25) + (0.25 \times 0.75 \times 0.625) + (0.25 \times 0.25 \times 0.75)\}$

$= \frac{9}{32}$

$= \mathbf{0.28 (2s.f)}$

c) $\text{P(player does not have two consecutive successes)} = \text{P}(S\bar{S}S)$

$= 1 - (0.75 \times 0.625 \times 0.75)$

$= \frac{83}{128}$

$= \mathbf{0.64\ (2s.f)}$

d) P(two consecutive success given that the player has exactly two successes)

$$P(\,2S \mid 2S\,) = \frac{P(SS\bar{S})+P(\bar{S}SS)}{P(SS\bar{S})+P(S\bar{S}S)+P(\bar{S}SS)}$$

$$= \frac{(0.75\times0.375\times0.1875)+(0.25\times0.75\times0.375)}{(0.75\times0.375\times0.1875)+(0.75\times0.625\times0.75)+(0.25\times0.75\times0.375)}$$

$$= \mathbf{\frac{17}{37}}$$

$$= \mathbf{0.46(2s.f)}$$

2. The amounts of money, x dollars, that 24 people had in their pockets are summarized by $\sum(x-36) = -60$ and $\sum(x-36)^2 = 227.76$. Find $\sum x$ and $\sum x^2$. [5]

SOLUTION

$\sum(x-36) = -60$

$\sum x - \sum 36 = -60$

$\therefore \sum x = 24 \times 36 - 60$

$\boldsymbol{\sum x = 804}$

Now, $\sum(x-36)^2 = 227.76$

$\sum(x^2 - 72x + 1296) = 227.76$

$\sum x^2 - 72\sum x + 1296 \times 24 = 227.76$

$\therefore \sum x^2 = 72 \times 804 - 1296 \times 24 + 227.76$

$\boldsymbol{\sum x^2 = 27011.76}$

3. A code consists of 10 digits, 4 of which are zeros and 6 of which are ones. Calculate the number of such blocks in which the first and last digits are of the same as each other. [4]

SOLUTION

0000111111

$\text{When the first and last digit is 0, then we treat 2 0s as non} - \text{existing}$

$\therefore \text{ possible number of blocks} = \frac{8!}{2!\times 6!} = 28$

$\text{When the first and last digit is 1, then we treat 2 1s as non} - \text{existing}$

$\therefore \text{ possible number of blocks} = \frac{8!}{4!\times 4!} = 70$

$\text{Now, total possible number blocks} = (\mathbf{28} + \mathbf{70}) = \mathbf{98\ ways}$

4.

a) An unbiased tetrahedral die has faces marked 1, 2, 3, 4. If the die lands on the face marked 1, the player has to play 10 USD.
If it lands on a face marked with a 2 or a 4, the player wins 5 USD and if it lands on a 3, the player wins 3 USD. Find the expected gain in one throw. [5]

b) A discrete random variable X can take values 10 and 20 only. If E(X)= 16, write out the probability distribution of X. [7]

SOLUTION

a) Let x be the amount paid or gained on each throw

x	-10	5	3
$P(X = x)$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$

Expected gain; $\left(-10 \times \frac{1}{4}\right) + \left(5 \times \frac{1}{2}\right) \times \left(3 \times \frac{1}{4}\right) = \frac{3}{4} \approx$ **USD 0.75**

b)

x	10	20
$P(X = x)$	a	b

Now, $(p.d.f)_{\forall} = 1$

$\therefore a + b = 1$ ....(1)

Since, E(X)=16

Then, $10a + 20b = 16$ ....(2)

$a = 1 - b$

$10(1 - b) + 20b = 16$

$10 - 10b + 20b = 16$

$10b = 6$

$\boldsymbol{b = \frac{6}{10}}$

$\therefore \boldsymbol{a = \frac{4}{10}}$ [Substitution of equation (1)]

Now, **p.d.f** of X is;

x	10	20
$P(X = x)$	$\frac{4}{10}$	$\frac{6}{10}$

5. The continuous random variable H has continuous p.d.f. $f(h)$ where

$$f(h)=\begin{cases}\frac{h}{3}-\frac{2}{3} & 2\le h\le 3\\ \alpha & 3\le h\le 5\\ 2-\beta h & 5\le h\le 6\\ 0 & \text{otherwise}\end{cases}$$

Find

a) α and β [2]

b) $F(h)$ and sketch $y=F(h)$ [4]

c) $P(2\le H\le 3.5)$ [2]

SOLUTION

a) $\frac{h}{3}-\frac{2}{3}=\sigma$ and $\sigma=2-\beta h$

$\frac{3}{3}-\frac{2}{3}=\alpha$ $\frac{1}{3}=2-\beta(5)$

$\sigma=\frac{1}{3}$ $5\beta=\frac{5}{3}$

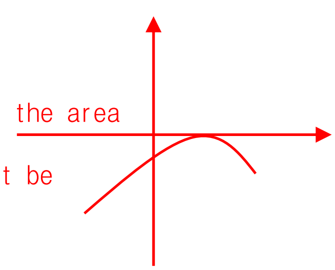
$\beta=\frac{1}{3}$

b) $$f(h)=\begin{cases}\frac{h}{3}-\frac{2}{3} & 2\le h\le 3\\ \frac{1}{3} & 3\le h\le 5\\ 2-\frac{1}{3}h & 5\le h\le 6\\ 0 & \text{otherwise}\end{cases}$$

1st Row; $\int_2^t\left(\frac{h}{3}-\frac{2}{3}\right)\,dh=\left[\left(\left(\frac{1}{3}\right)\frac{h^2}{2}-\frac{2}{3}h\right)\right]_2^t$

$=\left[-\frac{2}{3}-\left(\frac{t^2}{6}-\frac{2}{3}t\right)\right]$

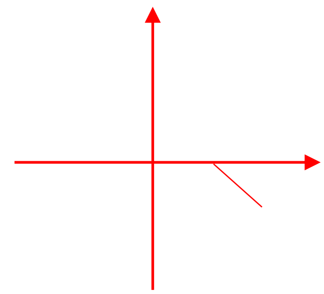
$=\frac{2}{3}t-\frac{t^2}{6}-\frac{2}{3}$ [A sketch of this graph, shows that the area is below the x-axis yet area cannot be for instance (-A units²)]



Therefore from 1st Row we get; $-\left[\frac{2}{3}t-\frac{t^2}{6}-\frac{2}{3}\right]=\frac{t^2}{6}+\frac{2}{3}-\frac{2}{3}t$

2nd Row; $\int_3^t \frac{1}{3}\,dh = \left[\frac{1}{3}h\right]_3^t$

$=\left[\frac{3}{3}-\frac{1}{3}t\right]$ [A sketch of this graph, shows that the area is below the x-axis yet area cannot be for instance ($-A$ units²)]

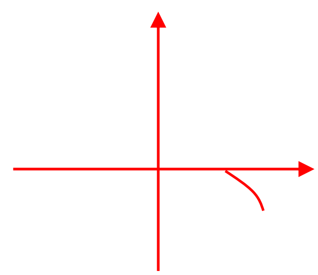


Therefore from 2nd Row we get; $-\left[\frac{3}{3}-\frac{1}{3}t\right]=-1+\frac{1}{3}t$

3rd Row; $\int_5^t \left(2-\frac{1}{3}h\right)dh = \left[2h-\frac{1}{3}\left(\frac{h^2}{2}\right)\right]_5^t$

$=\left[\frac{35}{6}-\left(2t-\frac{1}{6}t^2\right)\right]$

$=\left[\frac{1}{6}t^2-2t+\frac{35}{6}\right]$ [A sketch of this graph from 5 to 6, shows that the area is below the x-axis yet area cannot be for instance ($-A$ units²)]



Therefore from 3rd Row we get; $-\left[\frac{1}{6}t^2-2t+\frac{35}{6}\right]=-\frac{1}{6}t^2+2t-\frac{35}{6}$

Now, 1st Row, then 1st Row + 2nd Row, then finally 1st Row + 2nd Row + 3rd Row

Will give us the cumulative distribution function, $F(h)$.

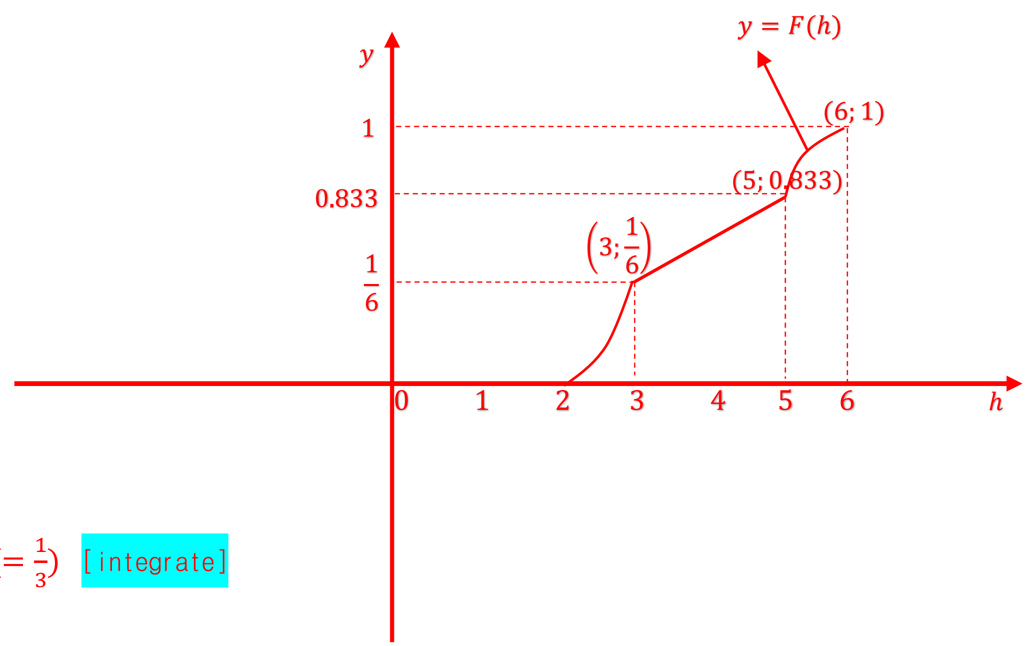
In general, cumulative means incorporating all data up to the last!

Therefore,

$$F(h) = \begin{cases} -\frac{2}{3}h + \frac{h^2}{6} + \frac{2}{3} & 2 \le h \le 3 \\ \left(-\frac{2}{3}(3) + \frac{3^2}{6} + \frac{2}{3}\right) + \left(-1 + \frac{1}{3}h\right) & 3 \le h \le 5 \\ \left(-\frac{2}{3}(3) + \frac{3^2}{6} + \frac{2}{3}\right) + \left(-1 + \frac{1}{3}(5)\right) + \left(-\frac{1}{6}h^2 + 2h - \frac{35}{6}\right) & 5 \le h \le 6 \\ 1 & h \ge 6 \end{cases}$$

$$\therefore F(h) = \begin{cases} -\frac{2}{3}h + \frac{h^2}{6} + \frac{2}{3} & 2 \le h \le 3 \\ -\frac{5}{6} + \frac{1}{3}h & 3 \le h \le 5 \\ -\frac{1}{6}h^2 + 2h - 5 & 5 \le h \le 6 \\ 1 & h \ge 6 \end{cases}$$

Now, the sketch of the graph, $F(h)$ is;



c) Ans. $(= \frac{1}{3})$ [integrate]

6. A random sample of St Dominic`s mathematics students marks for end of term test are shown below.

67 76 85 42 93 48 93 46 52

72 77 53 41 48 86 78 56 80

70 70 66 62 54 85 60 58 43

58 74 44 52 74 52 82 78 47

66 50 67 87 78 86 94 63 72

63 44 47 57 68 81

a) Contract a stem a leaf diagram to represent these data. [6]

b) Find the median and the quartiles for this distribution. [6]

c) Draw a box plot to represent these data. [4]

d) Give one advantage of using

i) a stem and leaf diagram

ii) a box plot,

to illustrate data such as that given above. [2]

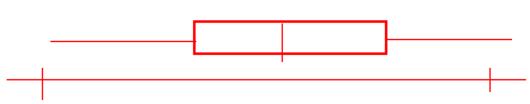
SOLUTION

a)

stem	leaf
4	1 2 3 4 4 6 7 7 8 8
5	0 2 2 23 4 6 7 8 8
6	0 2 3 3 6 6 7 7 8
7	0 0 2 2 4 4 6 7 8 8 8
8	0 1 2 5 5 6 6 7
9	3 3 4

b) Q_2 = 66 miles , Q_1 = 52 miles, Q_3 = **78 miles**

c)



40 50 60 70 80 90 $[distance\ (miles)]$

d) **Keeps original data**

Shows how symmetrical the data is.

7. Calculate the equation of the regression line x on y for the following distribution,

x	22	36	25	41	35	40
y	78	70	65	58	48	42

and the product-moment correlation coefficient, (r) and comment your value. [7]

SOLUTION

The equation of the line required can be written in the form;

$x = a + by$ where $a = \bar{x} - b\bar{y}$ and $b = \frac{S_{xy}}{S_{yy}}$.

So, the equation of the regression line X on Y is; $(x - \bar{x}) = b(y - \bar{y})$

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum y^2 - (\sum y)^2}$$

$$b = \frac{6(11599) - (199)(361)}{6(22641) - (361)^2}$$

$$b = -\frac{449}{1105}$$

$$b = -0.4063$$

$$(x - 33.16666667) = -\frac{449}{1105}(y - 60.16666667)$$

$$x = -\frac{449}{1105}y + 57.61447964$$

$\boldsymbol{x = -0.4063y + 57.6145}$

Now, the product-moment correlation coefficient, (r) is;

$$r = \frac{n\sum xy - \sum x\sum y}{\sqrt{n\sum x^2 - (\sum x)^2} \times \sqrt{n\sum y^2 - (\sum y)^2}}$$

$$r = \frac{6(11599) - (199)(361)}{\sqrt{6(6911) - (199)^2} \times \sqrt{6(22641) - (361)^2}}$$

$r = -0.6993760986$

$\boldsymbol{r = -0.70}$ **(2s.f)**

There is a strong negative correlation between the x and y values.

8.

a) In a certain country, 68% of households have a printer. Find the probability that, in a random sample of 8 households, 5, 6 or 7 households have a printer.. [4]

b) Use an approximation to find the probability that, in a random sample of 500 households, more than 337 households have a printer. [4]

c) Justify your use of the approximation in part **(b)**. [1]

SOLUTION

a) Let X be the households with printers, with parameter $p = 0.68$ and $n = 8$

Then, $\boldsymbol{X \sim Bin(8, 0.68)}$

Now, $P(5, 6 \text{ or } 7) = {}^8_5C(0.68)^5(0.32)^3 + {}^8_6C(0.68)^6(0.32)^2 + {}^8_7C(0.68)^7(0.32)^1$

$= 0.722$

b) Since, $np = 500(0.68) = 340 > 5$ and $nq = 500(0.32) = 160 > 5$

Then, $X \sim N(np, npq)$

$X \sim N(340, 108.8)$

$P(X > 337)$ will be $P(X > 337.5)$ [using continuity correction]

$P(X > 337.5) = P\left(z > \frac{337.5-340}{\sqrt{108.8}}\right)$

$= P(z > -0.2396)$

$= \emptyset(0.2396)$ [From tables]

$= 0.595$

c) Since, $np = 500(0.68) = 340 > 5$ and $nq = 500(0.32) = 160 > 5$

9. In a golf tournament, the number of times in a day that a 'hole-in-one' is scored is denoted by the variable X, which has a Poisson distribution with mean 0.15. Mr Kuna offers to pay $200 each time that a hole-in-one is scored during 5 days of play. Find the expectation and variance of the amount that Mr Kuna pays. [4]

SOLUTION

$X \sim Po(0.15)$ in a day.
So, for 5 days $X \sim Po(5 \times 0.15)$ ...
Then the expectation of the amount that Mr Kuna pays is;
$(0.75 \times 200) = \$\ 150$

And the variance is;
$(200^2 \times 0.75) = \$\ 30\ 000$

10. In the past, the flight time, in hours, for a particular flight has had mean 6.20 and standard deviation 0.80. Some new regulations are introduced. In order to test whether these new regulations have had any effect upon flight times, the mean flight time for a random sample of 40 of these flights is found.

a) State what is meant by a Type I error in this context. [2]

b) The mean time for the sample of 40 flights is found to be 5.98 hours. Assuming that the standard deviation of flight times is still 0.80 hours, test at the 5% significance level whether the population mean flight time has changed. [4]

c) State, with a reason, which of the errors, Type I or Type II, might have been made in your answer to part **(b)**. [2]

SOLUTION

a) Conclude flight times affected when in fact they have not been.

b) Let X be the flight time

Let the population mean be μ and the population standard deviation be σ.

$\mathrm{H_0};\ \mu = 6.2$

$\mathrm{H_0};\ \mu \neq 6.2$

So, if $\mathrm{H_0}$ is true, then $X \sim M(6.2,\ 0.80^2)$

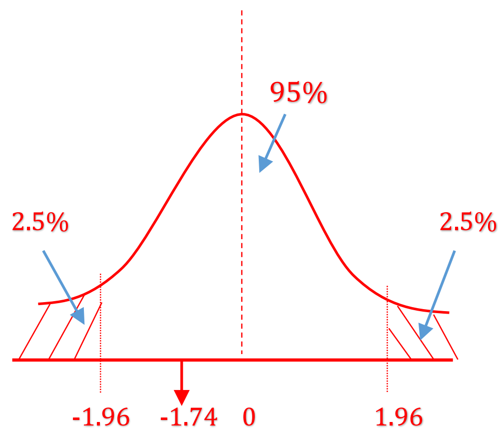
Use a two tailed test, at 5% level of significance.

So, we reject $\mathrm{H_0}$ if $Z_{cal} < -1.96$ or $Z_{cal} > 1.96$

Now, $Z_{cal} = \frac{\bar{X}-\mu}{\frac{\sigma}{\sqrt{n}}}$

$\therefore Z_{cal} = \frac{5.98-6.2}{\frac{0.80}{\sqrt{40}}}$

$= -1.739252713$



Since $Z_{cal} > -1.96$, there is no evidence that flight times are affected at 5% level of significance.

c) $\mathrm{H_0}$ was not rejected, hence type II error.

11.

a) A petrol station finds that its daily sales, in litres, are normally distributed with mean 4520 and standard deviation 560.

i) Find on how many days of the year (365 days) the daily sales can be expected to exceed 3900 litres. [4]

The daily sales at another petrol station are X litres, where X is normally distributed with mean m and standard deviation 560. It is given that $P(X > 8000) = 0.122$.

ii) Find the value of m. [3]

iii) Find the probability that daily sales at this petrol station exceed 8000 litres on fewer than 2 of 6 randomly chosen days. [3]

b) The random variable Y is normally distributed with mean μ and standard deviation σ. Given that $\sigma = \frac{2}{3}\mu$, find the probability that a random value of Y is less than 2μ. [3]

SOLUTION

a)

i. $X \sim N(4520,\ 520^2)$ [let X be the daily sales of a petrol station]

$P(X > 3900) = P\left(z > \frac{3900-4520}{560}\right)$

$P(z > -1.107)$

$= \emptyset(1.107)$

$= 0.8657$

Therefore number of days is; $365 \times 0.8657 \approx 315$ days.

ii. Since, $P(X > 8000) = 0.122$

Then, $P\left(z > \frac{m-8000}{560}\right) = 0.122$

$\therefore z = 1.165$

$1.165 = \frac{8000-m}{560}$

$m = 7250$

iii. Now, $X \sim B(6, 0.122)$

Therefore, $P(X < 2) = (0.878)^6 + {}^6_1C(0.122)^1(0.878)^5$

$= 0.84$ (2s.f)

b) $Y \sim N(\mu, \sigma)$

Given that $\sigma = \frac{2}{3}\mu$, then $Y \sim N\left(\mu, \frac{2}{3}\mu\right)$

$P(Y < 2\mu) = P\left(z < \frac{2\mu-\mu}{\frac{2}{3}\mu}\right)$

$= P(z < 1.5)$

$= 0.933$

12. A firm of solicitors claims that, on average, interviews with clients last 50 minutes. A random sample of 15 interviews is chosen, and the time taken for each interview, x minutes, is noted. The results are summarized by $\sum x = 746$ and $\sum x^2 = 37\,180$. Assuming that the time for an interview has a normal distribution, determine at 5% significance level, whether the firm is overstating the average interview. [6]

SOLUTION

Let X be the time taken on interviews with clients.

Let the population mean be μ, and the population standard deviation be σ.

$\bar{x} = \frac{\sum x}{n} = \frac{746}{15} = 49.73333333$

$\hat{\sigma}^2 = \frac{1}{n-1}\left(\sum x^2 - \frac{(\sum x)^2}{n}\right)$

$= \frac{1}{15-1}\left(37\ 180 - \frac{(746)^2}{15}\right)$

$= \frac{592}{105} = 5.638095238$

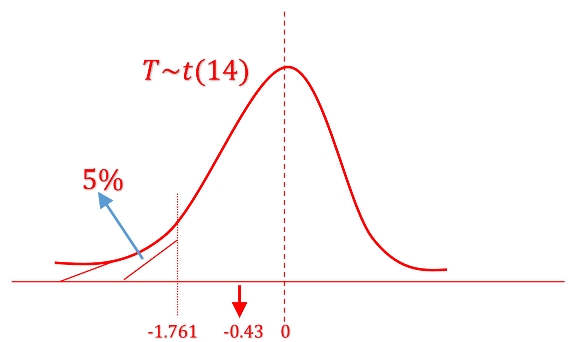
$H_0;\ \mu = 50$

$H_0;\ \mu < 50$

If H_0 is true, and since n is small and also σ^2 is unknown, then the test statistics is T,

where $T = \frac{\bar{X}-\mu}{\frac{\hat{\sigma}}{\sqrt{n}}}$ and also, $T \sim t(n-1)$

i.e. $T = \frac{\bar{X}-50}{\sqrt{\frac{5.638095238}{15}}}$ and $T \sim t(14)$



Use a one-tailed test (upper tail) at 5% level.

So we reject H_0 if the test value of $t < -1.761$

$t = \frac{49.73333333-50}{\sqrt{\frac{5.638095238}{15}}} = -0.4349593799$

Since, $t > -1.761$, we fail to reject H_0 at 5% level of significance and hence conclude that the solicitors claim is upheld.

13. The following data give the heights in centimeters of 100 male students.

Height (cm)	Frequency
$155 - 160$	5
$161 - 166$	17
$167 - 172$	38
$173 - 178$	25
$179 - 184$	9
$185 - 190$	6

Find the expected frequencies for a normal distribution having the same mean and standard deviation as the data given, and test the goodness of fit, using a 5% level of significance. [13]

SOLUTION

Height (cm)	Mid-points (x)	Frequency (y)
$154.5 - 160.5$	157.5	5
$160.5 - 166.5$	163.5	17
$166.5 - 172.5$	169.5	38
$172.5 - 178.5$	175.5	25
$178.5 - 184.5$	181.5	9
$184.5 - 190.5$	187.5	6

$\mu = \bar{x} = 171.54$

$\hat{\sigma}^2 = 7.146264123^2$ [from the calculator]

$\mathrm{H_0}; X \sim N(171.54; 7.146^2)$

$\mathrm{H_0}; X$ is not distributed this way.

Probabilities,

$P(154.5 < X < 160.5) = P\left(\frac{154.5-171.54}{7.146264123} < z < \frac{160.5-171.54}{7.146264123}\right)$

$= P(-2.384 < z < -1.545)$

$= \emptyset(2.384) - \emptyset(1.545)$

$= 0.9914 - 0.9388$

$= 0.0526 \times 100 = 5.26$

$P(160.5 < X < 166.5) = P\left(\frac{160.5-171.54}{7.146264123} < z < \frac{166.5-171.54}{7.146264123}\right)$

$= P(-1.545 < z < -0.705)$

$= \emptyset(1.545) - \emptyset(0.705)$

$= 0.9388 - 0.7595$

$= 0.1793 \times 100 = 17.93$

$P(166.5 < X < 172.5) = P\left(\frac{166.5-171.54}{7.146264123} < z < \frac{172.5-171.54}{7.146264123}\right)$

$= P(-0.705 < z < 0.134)$

$= \emptyset(0.705) + \emptyset(0.134) - 1$

$= 0.7595 + 0.5533 - 1$

$= 0.3128 \times 100 = 31.28$

$P(172.5 < X < 178.5) = P\left(\frac{172.5-171.54}{7.146264123} < z < \frac{178.5-171.54}{7.146264123}\right)$

$= P(0.134 < z < 0.974)$

$= \emptyset(0.974) - \emptyset(0.134)$

$= 0.8350 - 0.5533$

$= 0.2817 \times 100 = 28.17$

$P(178.5 < X < 184.5) = P\left(\frac{178.5-171.54}{7.146264123} < z < \frac{184.5-171.54}{7.146264123}\right)$

$= P(0.974 < z < 1.814)$

$= \emptyset(1.814) - \emptyset(0.974)$

$= 0.9652 - 0.8350$

$= 0.1302 \times 100 = 13.02$

$P(184.5 < X < 190.5) = P\left(\frac{184.5-171.54}{7.146264123} < z < \frac{190.5-171.54}{7.146264123}\right)$

$= P(1.814 < z < 2.653)$

$= \emptyset(2.653) - \emptyset(1.814)$

$= 0.9960 - 0.9652$

$= 0.0308 \times 100 = 3.08$

Height (cm)	Mid-points (x)	Frequency (y) (Observed) (O)	Expected frequencies (E)
$154.5 - 160.5$	157.5	5	5.26
$160.5 - 166.5$	163.5	17	17.93
$166.5 - 172.5$	169.5	38	31.28
$172.5 - 178.5$	175.5	25	28.17
$178.5 - 184.5$	181.5	9	13.02
$184.5 - 190.5$	187.5	6	3.08

Degrees of freedom, (v)

There are 5 classes.

There are 3 restrictions namely;

- $\sum E = 100$
- The mean of the distribution has been estimated from the data.
- The variance of the normal distribution has been estimated from the data.

Therefore, $v = 5 - 3 = 2$, hence we consider the $X^2(2)$ distribution.

Test at 5% level of significance, so rejection region is $X^2_{5\%} = 5.991$.

Therefore, we reject H_0 if $X^2_{cal} > 5.991$

O	E	$\frac{(O-E)^2}{E}$
5	5.26	0.01285171103
17	17.93	0.04823759063
38	31.28	1.443682864
25	28.17	0.3567234647
15	16.1	0.0751552795
$\sum O = 100$	$\sum E = 100$	$\sum \frac{(O-E)^2}{E} = 1.93665091$

Since, $X^2_{cal} = 1.94 < 5.991$ we fail to reject H_0, and hence conclude that data follows a normal distribution i.e. $X \sim N(171.54; 7.146^2)$, at 5% level of significance.

FEEL FREE TO CONTACT ME FOR ANY ADJUSTMENTS, CLARIFICATIONS AND ASSISTANCE!

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"Concept before anything!", Author

Proverbs 11 vs. 2

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