THE PUBLIC ACCOUNTANTS EXAMINATIONS BOARD

A Committee of the Council of ICPAU

CPA (U) EXAMINATIONS

LEVEL ONE

QUANTITATIVE TECHNIQUES – PAPER 2

TUESDAY 16 MARCH, 2021

INSTRUCTIONS TO CANDIDATES:

1. Time allowed: **3 hours 15 minutes.**

   The first 15 minutes of this examination have been designated for reading time. You may not start to write your answer during this time.

2. This examination contains **six** question and only **five** questions are to be attempted. Each question carries 20 marks.

3. Formulae and tables are provided on pages 9 – 14.

4. Write your answer to each question on a fresh page in your answer booklet.

5. Please, read further instructions on the answer booklet, before attempting any question.

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Attempt five of the six questions

Question 1

(a) (i) Distinguish between discrete and continuous data. **(2 marks)**

(ii) Explain the advantages of grouping data. **(2 marks)**

(b) The daily hours of sunshine in Kampala from 1st August 2020 to 9th September 2020 from the metrological department in Entebbe were as shown below:

7.0	7.6	12.5	12.9	8.3	9.7	8.3	11.1	7.5	8.1
7.5	9.8	10.4	11.6	11.3	7.3	7.8	6.5	6.2	8.4
6.1	5.6	5.6	5.8	4.8	4.3	3.0	2.6	2.8	3.9
2.6	3.2	2.4	2.6	9.2	7.3	7.0	6.5	10.1	5.5

A district Agricultural officer was interested in advising the farmers about the weather conditions that favour drying of their produce.

Required:

(i) Using uniform class intervals and starting with the class 2.0 - 2.9; construct a frequency distribution table for the data above. **(3 marks)**

From the table above, calculate the following:

(ii) Average number of hours of sunshine per day. **(2 marks)**

(iii) Co-efficient of variation and comment on the result. **(6 marks)**

(c) ALD a non-governmental organization has carried out a research on the age distribution for teachers in school A and school B in the newly created district of Mbikwe in Eastern Uganda. The results are as shown in the table below.

	Frequencies	
Age	School A	School B
20 -	4	0
25 -	6	2
30 -	11	4
35 -	14	7
40 -	9	11
45 -	5	12
50 -	5	11
55 -	3	8
60 -	0	5

Required:

(i) Draw frequency polygons on the same graph to compare the age distributions of the teachers in school A and B.

(4 marks)

(ii) Comment on your results. **(1 mark)**

(Total 20 marks)

Question 2

(a) Explain the characteristics of a binomial distribution. **(2 marks)**

(b) CICL LTD has recently opened a chocolate company in Namanve industrial park. Due to inexperience of the newly recruited staff, 10% of the chocolates produced in the factory are mis-shaped. In a sample of 1000 chocolates, find the probability that the number of mis-shapes is:

(i) Less than 80. **(2 marks)**

(ii) Between 90 and 115 inclusive. **(3 marks)**

(c) The manager of VHL has established that the number of customers visiting his office follows a discrete random variable r with probability $P(r)$ defined by

$P(r) = kr^2$ r = 1, 2, 3

$P(r) = k\,(7-r)^2$, r = 4, 5, 6

$P(r)$ = 0, otherwise

Required:

Determine;

(i) The value of k **(3 marks)**

(ii) The mean number of customers that visit the manager's office.

(4 marks)

(d) NELN General Services Ltd a dealer in whole sale business receives customers at an average rate of 4 customers per minute. Assuming that customers' arrivals follow a Poisson distribution;

Required:

Calculate the probability that:

(i) No customer arrives in any particular minute. **(2 marks)**

(ii) Two or more customers arrive in any particular minute. **(4 marks)**

(Total 20 marks)

Question 3

(a) Explain the following terms as applied in hypothesis testing.

(i) Hypothesis **(1 mark)**

(ii) Critical value **(1 mark)**

(iii) Null hypothesis **(1 mark)**

(b) In a certain meeting, the guests were served with the breakfast of cereals with constituents A, B, C, and D. The cost of the cereals in Uganda shillings per kilogram in July, August 2020 and quantities needed were as shown in the table below.

	A	B	C	D
July				
Prices (Shs)	800	1,050	1,200	800
Quantities(kg)	6	4	3	2
August				
Prices (Shs)	880	1,260	1,500	1,080
Quantities(kg)	8	5	2	3

Required:

Using July as the base month:

(i) Calculate the simple aggregate price index for August 2020. **(2 marks)**

(ii) Compute Laspreyres quantity index for August 2020 and comment on the result. **(4 marks)**

(c) Kalilo Farmers Association deals in the growing and production of maize, they need to insure their produce against the unexpected weather patterns. The last released information from national forecasters show that the probability of receiving rain in the next six months is 0.75. They can decide to insure their produce in order to attract investors or fail to insure such that they sell on the local market. Using past records, their sales during a rainy season fetch 10 million if insured otherwise 8 million. If there is no rain, the sales fetch 9 million if insured otherwise only 6 million as shown below:

Decision alternatives	states of nature	
	Rain	No Rain
Insure	10,000,000	9,000,000
Not Insure	8,000,000	6,000,000

Required:

Demonstrate if the farmers should insure their produce? **(5 marks)**

(c) The personnel manager of a large firm is investigating whether there is any association between the length of service of the employees and the type of training they receive. A random sample of 200 employee records is taken from the last few years and is classified according to these criteria. Length of service is classified as short; (less than one year), medium (1- 3 years) and long (more than 3 years) type of training is classified as being merely an initial induction, on job and continuous training. The data is as follows.

		Length of service		
		short	medium	long
Type of training	Induction Course	26	30	24
	On job &continuous	28	32	60

Required:

Using Chi - square, examine at the 5% level of significance whether this data provide evidence of association between length of service and type of training, stating clearly your null alternative hypothesis.

(6 marks)
(Total 20 marks)

Question 4

(a) Explain the applications of linear regression. **(3 marks)**

(b) The Manager of a certain office supervises 10 clerical assistants, each using the word-processor. The assistants did not receive the same training in the use of word-processor. In order to make an assessment of the need for training, the manager monitored their work during a given week recording the number of pieces of work correctly produced (x) and the number of days spent on training (y).

The results are summarised in the table below.

x	35	26	33	22	40	31	22	20	24	23
y	10	2	7	5	11	8	9	3	8	2

Required:

(i) Determine the equation x on y by least squares method.

(8 marks)

(ii) Using the equation, find the number of pieces of work produced correctly if a person is trained for 14 days. **(1 mark)**

(c) ABC Ltd is the leading distributor of Yamaha motor cycles in Uganda and their sales as at November 2020 are as shown in the table below.

Months	Sales
Jan	540
Feb	550
March	660
April	510
May	480
June	500
July	470
August	460
September	510
October	550
November	590

In 2020, the company recruited a new General Manager and he would wish to make forecasts based on the previous sales.

Required:

Using smoothing constant $a = 0.2$ and January sales as February forecasts,

(i) Find the forecasted sales corresponding to the year 2021.

(7 marks)

(ii) Using (c) (i), find the forecast sales for January 2022.

(1 mark)

(Total 20 marks)

Question 5

(a) XYZ is the leading distributor of Tampako drink. Their fixed costs are Shs 660 per unit. The variable costs are given by the function $V(x) = 250 - 2x^2$, where x is the number of units produced per day.

Required:

(i) Derive a function to determine the total costs for a day. **(2 marks)**

(ii) Find the minimum costs per day. **(4 marks)**

(b) ABIB Ltd specialises in the production of hedges (x) and doors (y). The raw material absorption of the two products per day follows a production function given by $y = 4x - 2x^2$.

Required:

(i) Sketch a graph of $y = 4x - 2x^2$ **(8 marks)**

(ii) From the graph, find the maximum number of hedges and doors that can be produced in the above factory per day. **(1 mark)**

(c) A new car dealer in Namanve industrial park assembles two types of cars, Sanny and Hiace. On a certain day he assembled 4 Sanny and 2 Hiace at a total cost of Shs 80,000,000. The following day he assembled 3 Sanny cars one Hiace at a total cost of Shs 50,000,000.

Required:

Using matrix method, find the total cost of assembling each car.

(5 marks)
(Total 20 marks)

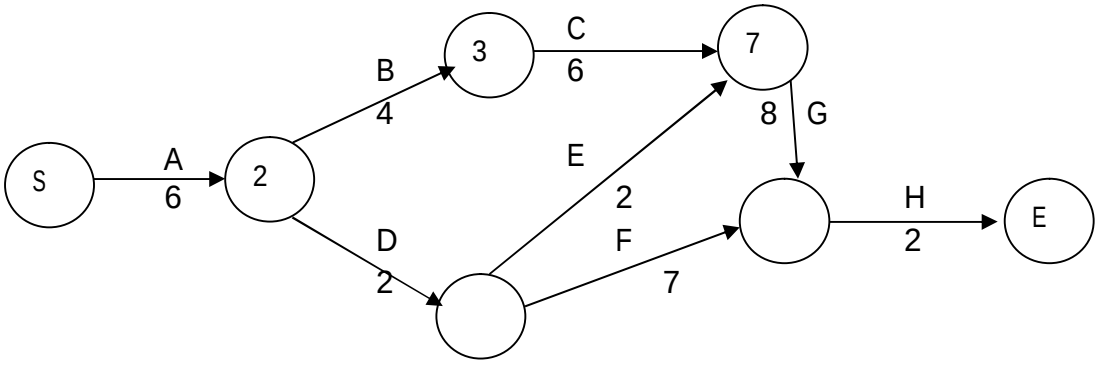
Question 6

(a) Explain the following terms as applied in linear programming.

(i) Dual **(1 mark)**

(ii) Primal **(1 mark)**

(b) COMBO Ltd is a transport company specializing in the delivery of cement in the East African region. It has been doing all its operations using the manual system. During the recently concluded audit, the auditors advised the management to embrace application of technology in their operations. The managing Director hired a consultant from South Africa to develop for him a software that can help him manage his fleet well. The consultant has sent him a schedule of activities on a network as shown below.



The Managing Director has approached you for interpretation of the above network.

Required:

(i) Present the above information in a tabular form clearly indicating the activities, preceding activities and the activity duration in days.
(4 marks)

(ii) Determine the critical path. **(2 marks)**

(c) Jumary Company Ltd recycles two types of polythene bags x_1 and x_2 in varying proportions to produce three types of plastic cups A, B and C. He wishes to produce at least 150 units of A, 200 units of B and 60 units of C. Each ton of x_1 yields 3 units of A, 5 of B and 3 of C. Each ton of x_2 yields 5 units of A, 5 of B and 1 of C. if x_1 costs Shs 40,000 per ton and x_2 Shs 50,000 per ton,

Required:

(i) Formulate a linear programming model for the above data.
(3 marks)

(ii) Generate the dual for the linear programming model in (b) (i) above.
(3marks)

(iii) Solve the dual in (b) (ii) above to determine the minimum costs.
(6 marks)
(Total 20 marks)

FORMULAE

1. Combination $^{n}C_{r} = \frac{n!}{(n-r)!r!}$
2. Permutations $^{n}p_{r} = \frac{n!}{(n-r)!}$
3. Mean of the binomial distribution = np
4. Standard deviation = $\sqrt{npq}$
5. Variance of the binomial distribution = $np(1-p)$
6. Standard error of population proportion $S_{ps} = \sqrt{\frac{pq}{n}}$
7. Spearman's rank correlation coefficient $r = 1 - \frac{6\sum d^2}{n(n^2-1)}$
8. Product moment coefficient of correlation = $\frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2) \times (n\sum y^2 - (\sum y)^2)}}$
9. Cost slope = $\frac{\text{crash cost – normal cost}}{\text{normal time – crash time}}$
10. Harmonic mean (ungrouped data) $hm = \frac{n}{\sum \frac{1}{x}}$
11. Sample mean $\bar{x} = \frac{\sum x}{n}$
12. Harmonic mean (grouped data) $hm = \frac{n}{\sum \frac{f}{x}}$
13. Quartile coefficient of dispersion = $\frac{Q_3 - Q_1}{Q_3 + Q_1}$
14. Bowley's coefficient of skeweness = $\frac{Q_3 + Q_1 - 2Q_2}{Q_{3-}Q_1}$
15. Mean $\bar{x} = A + \frac{\sum fd}{\sum f}$ or Mean $\bar{x} = \frac{\sum fx}{\sum f}$

16. Median $= Lb + \left(\dfrac{\frac{N}{2} - Cfb}{fm} \right) C$

17. Mode $= lm + \left(\dfrac{d_1}{d_1 + d_2} \right) C$

18. Variance $Var(x) = \dfrac{\sum fx^2}{\sum f} - \left(\dfrac{\sum fx}{\sum f} \right)^2$

19. Standard deviation $\delta = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2} \qquad = \sqrt{\dfrac{\sum f(x-\bar{x})^2}{\sum f}}$

20. Sample standard deviation $s = \sqrt{\dfrac{\sum (x-\bar{x})^2}{n-1}}$

21. Least squares regression equation of y on x is given by; $y = a + bx$

    Where; $b = \dfrac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2}$ and $a = \dfrac{\sum y}{n} - \dfrac{b\sum x}{n}$

22. Least squares regression equation of x on y is given by; x = c +dy

    Where $c = \dfrac{\sum x}{n} - \dfrac{d\sum y}{n}$ and $d = \dfrac{n\sum xy - \sum x \sum y}{n\sum y^2 - (\sum y)^2}$

23. Standardising normal. $z = \dfrac{\bar{x} - \mu}{\sigma}$

24. Confidence interval for sample mean $= \bar{x} \pm t_{\alpha/2} \dfrac{s}{\sqrt{n}}$

25. $\chi^2 = \sum \dfrac{(O-E)^2}{E}$

26. Confidence interval of proportion $= p \pm z_{\alpha/2} \sqrt{\dfrac{pq}{n}}$

27. Pearson coefficient of skewness $Sk = \dfrac{(\bar{x} - \text{mode})}{s_d}$ or $Sk = \dfrac{3\left(\bar{x} - median\right)}{s_d}$

28. Expectation $= \sum xP(X = x)$

29. Laspeyres' price index $= \dfrac{\sum (p_1 \times q_0)}{\sum (q_0 \times p_0)} \times 100$

30. Paasche's Model = $\frac{\sum(p_1 \times q_1)}{\sum(q_1 \times p_0)} \times 100$

31. Weighted aggregate price index $= \frac{\sum wv_n}{\sum wv_0} \times 100$

32. Additive law of probability; $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

33. Conditional probability $P\left(A/B\right) = \frac{P(A \cap B)}{P(B)}$

34. Independence of A, B $P\left(A/B\right) = P(A) or P(A \cap B) = P(A) \times P(B)$

35. Continuous compounding $A = P(1+r)^n + \frac{b(1+r)^n - b}{r}$

36. Quotient rule of differentiation $f = \frac{vu^1 - uv^1}{v^2}$; where $f = \frac{u}{v}$

37. $Poisson Model P\left(X = x\right) = e^{-\lambda} \frac{\lambda^x}{x!}$

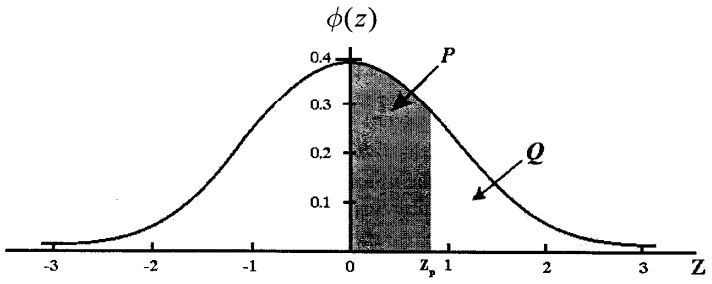
CUMULATIVE NORMAL DISTRIBUTION $P(z)$

Z	0	1	2	3	4	5	6	7	8	9	ADD 1	2	3	4	5	6	7	8	9
0.0	0.0000	0040	0080	0120	0160	0199	0239	0279	0319	0359	4	8	12	16	20	24	28	32	36
0.1	0.0398	0438	0478	0517	0557	0596	0636	0675	0714	0753	4	8	12	16	20	24	28	32	36
0.2	0.0793	0832	0871	0910	0948	0987	1026	1064	1103	1141	4	8	12	15	19	22	27	31	35
0.3	0.1179	1217	1255	1293	1331	1368	1406	1443	1480	1517	4	8	11	15	19	22	26	30	34
0.4	0.1554	1591	1628	1664	1700	1736	1772	1808	1844	1879	4	7	11	14	18	22	25	29	32
0.5	0.1915	1950	1985	2019	2054	2088	2123	2157	2190	2224	3	7	10	14	17	21	24	27	31
0.6	0.2257	2291	2324	2357	2389	2422	2454	2486	2517	2549	3	6	10	13	16	19	23	26	29
0.7	0.2580	2611	2642	2673							3	6	9	12	15	19	22	25	28
					2704	2734	2764	2794	2823	2852	3	6	9	12	15	18	21	24	27
0.8	0.2881	2910	2939	2967	2995	3023					3	6	8	11	14	17	20	22	25
							3051	3078	3106	3133	3	5	8	11	13	16	19	22	24
0.9	0.3159	3186	3212	3238	3264	3289					3	5	8	10	13	16	18	21	23
							3315	3340	3365	3389	2	5	7	10	12	15	17	20	22
1.0	0.3413	3438	3461	3485	3508						2	5	7	10	12	14	17	19	22
						3531	3554	3577	3599	3621	2	4	7	9	11	13	15	18	20
1.1	0.3643	3665	3686	3708							2	4	6	8	11	13	15	17	19
					3729	3749	3770	3790	3810	3830	2	4	6	8	10	12	14	16	18
1.2	0.3849	3869	3888	3907	3925						2	4	6	8	10	11	13	15	17
						3944	3962	3980	3997	4015	2	4	5	7	9	11	13	14	16
1.3	0.4032	4049	4066	4082	4099	4115	4131	4147	4162	4177	2	3	5	6	8	10	11	13	14
1.4	0.4192	4207	4222	4236	4251	4265	4279	4292	4306	4319	1	3	4	6	7	8	10	11	13
1.5	0.4332	4345	4357	4370	4382	4394	4406	4418	4429	4441	1	2	4	5	6	7	8	10	11
1.6	0.4452	4463	4474	4484	4495	4505	4515	4525	4535	4545	1	2	3	4	5	6	7	8	9
1.7	0.4554	4564	4573	4582	4591	4599	4608	4616	4625	4633	1	2	3	3	4	5	6	7	8
1.8	0.4641	4649	4656	4664	4671	4678	4686	4693	4699	4706	1	1	2	3	4	4	5	6	6
1.9	0.4713	4719	4726	4732	4738	4744	4750	4756	4761	4767	1	1	2	2	3	4	4	5	5
2.0	0.4772	4778	4783	4788	4793	4798	4803	4808	4812	4817	0	1	1	2	2	3	3	4	4
2.1	0.4821	4826	4830	4834	4838	4842	4846	4850	4854	4957	0	1	1	2	2	2	3	3	4
2.2	0.4861	4864	4868	4871	4875	4878	4881	4884	4887	4890	0	1	1	1	2	2	2	3	3
2.3	0.4893	4896	4898	4901	4904	4906	4909	4911	4913	4916	0	0	1	1	1	2	2	2	2
2.4	0.4918	4920	4922	4925	4927	4929	4931	4932	4934	4936	0	0	1	1	1	1	1	2	2
2.5	0.4938	4940	4941	4943	4945	4946	4948	4949	4951	4952									
2.6	0.4953	4955	4956	4957	4959	4960	4961	4962	4963	4964									
2.7	0.4965	4966	4967	4968	4969	4970	4971	4972	4973	4974									
2.8	0.4974	4975	4976	4977	4977	4978	4979	4979	4980	4981									
2.9	0.4981	4982	4982	4983	4984	4984	4985	4985	4986	4986									
3.0	0.4987	4990	4993	4995	4997	4998	4998	4999	4999	5000									

The table gives $P(z) = \int_0^z \phi(z)dz$

If the random variable Z is distributed as the standard normal distribution N(0,1) then:

1. $P(\text{o} < Z < z_p) = P(\text{Shaded Area})$
2. $P(Z > Z_p) = Q = ½ - P$
3. $P(Z^* > |Z_p|) = 1 - 2P = 2Q$



PERCENTAGE POINTS OF THE CHI-SQUARE (χ^2) DISTRIBUTION χ^2_Q

	Probability Q									
ν	0.995	0.990	0.975	0.950	0.100	0.050	0.025	0.010	0.005	0.001
1	0.0^4393	0.0^3157	0.0^3982	0.0^2393	2.706	3.841	5.024	6.635	7.879	10.83
2	0.0100	0.0201	0.0506	0.1026	4.605	5.991	7.378	9.210	10.60	13.82
3	0.0717	0.1148	0.2158	0.3518	6.251	7.815	9.348	11.34	12.84	16.27
4	0.2070	0.2971	0.4844	0.7107	7.779	9.488	11.14	13.28	14.86	18.47
5	0.4117	0.5543	0.8312	1.145	9.236	11.07	12.83	15.09	16.75	20.52
6	0.6757	0.8721	1.237	1.635	10.64	12.59	14.45	16.81	18.55	22.46
7	0.9893	1.239	1.690	2.167	12.02	14.07	16.01	18.48	20.28	24.32
8	1.344	1.646	2.180	2.733	13.36	15.51	17.53	20.09	21.95	26.12
9	1.735	2.088	2.700	3.325	14.68	16.92	19.02	21.67	23.59	27.88
10	2.156	2.558	3.247	3.940	15.99	18.31	20.48	23.21	25.19	29.59
11	2.603	3.053	3.816	4.575	17.28	19.68	21.92	24.73	26.76	31.26
12	3.074	3.571	4.404	5.226	18.55	21.03	23.34	26.22	28.30	32.91
13	3.565	4.107	5.009	5.892	19.81	22.36	24.74	27.69	29.82	34.53
14	4.075	4.660	5.629	6.571	21.06	23.68	26.12	29.14	31.32	36.12
15	4.601	5.229	6.262	7.261	22.31	25.00	27.49	30.58	32.80	37.70
16	5.142	5.812	6.908	7.962	23.54	26.30	28.85	32.00	34.27	39.25
17	5.697	6.408	7.564	8.672	24.77	27.59	30.19	33.41	35.72	40.79
18	6.265	7.015	8.231	9.390	25.99	28.87	31.53	34.81	37.16	42.31
19	6.844	7.633	8.907	10.12	27.20	30.14	32.85	36.19	38.58	43.82
20	7.434	8.260	9.591	10.85	28.41	31.41	34.17	37.57	40.00	45.31
21	8.034	8.897	10.28	11.59	29.62	32.67	35.48	38.93	41.40	46.80
22	8.643	9.542	10.98	12.34	30.81	33.92	36.78	40.29	42.80	48.27
23	9.260	10.20	11.69	13.09	32.01	35.17	38.08	41.64	44.18	49.73
24	9.886	10.86	12.40	13.85	33.20	36.42	39.36	42.98	45.56	51.18
25	10.52	11.52	13.12	14.61	34.38	37.65	40.65	44.31	46.93	52.62
26	11.16	12.20	13.84	15.38	35.56	38.89	41.92	45.64	48.29	54.05
27	11.81	12.88	14.57	16.15	36.74	40.11	43.19	46.96	49.64	55.48
28	12.46	13.56	15.31	16.93	37.92	41.34	44.46	48.28	50.99	56.89
29	13.12	14.26	16.05	17.71	39.09	42.56	45.72	49.59	52.34	58.30
30	13.79	14.95	16.79	18.49	40.26	43.77	46.98	50.89	53.67	59.70
40	20.71	22.16	24.43	26.51	51.81	55.76	59.34	63.69	66.77	73.40
50	27.99	29.71	32.36	34.76	63.17	67.50	71.42	76.15	79.49	86.66
60	35.53	37.48	40.48	43.19	74.40	79.08	83.30	88.38	91.95	99.61
70	43.28	45.44	48.76	51.74	85.53	90.53	95.02	100.4	104.2	112.3
80	51.17	53.54	57.15	60.39	96.58	101.9	106.6	112.3	116.3	124.8
90	59.20	61.75	65.65	69.13	107.6	113.1	118.1	124.1	128.3	137.2
100	67.33	70.06	74.22	77.93	118.5	124.3	129.6	135.8	140.2	149.4

The function tabulated is χ^2_Q defined by

$$\int_{\chi^2_Q}^{\infty} f(x)dx = Q; \quad f(x) = \frac{1}{2^{\nu/2}(\frac{1}{2}\nu - 1)!} x^{\nu/2-1} e^{-x/2} (x > 0)$$

where $f(x)$ is the probability density of the χ^2 distribution for ν degrees of freedom. Interpolation ν-wise for $\nu > 30$ gives adequate values (but errors up to 5 units in the last figure may occur for the smaller ν). For $\nu > 100$ the distribution of $\sqrt{(2\chi^2)}$ is approximately normal with mean $\sqrt{(2\nu - 1)}$ and unit variance.

Note: $0.0^4 2 = 0.00002$
$0.0^3 3 = 0.0003$
$0.0^2 4 = 0.004$

PERCENTAGE POINTS OF STUDENT'S t – DISTRIBUTION t_Q

	Probability*									
ν	0.25	0.10	0.05	0.025	0.01	0.005	0.0025	0.001	0.0005	Q
	0.50	0.20	0.10	0.050	0.02	0.010	0.0050	0.002	0.0010	$2Q$
1	1.000	3.078	6.314	12.71	31.82	63.66	127.3	318.3	636.6	
2	0.816	1.886	2.920	4.303	6.965	9.925	14.09	22.33	31.60	
3	0.765	1.638	2.353	3.182	4.541	5.841	7.453	10.21	12.92	
4	0.741	1.533	2.132	2.776	3.747	4.604	5.598	7.173	8.610	
5	0.727	1.476	2.015	2.571	3.365	4.032	4.773	5.893	6.869	
6	0.718	1.440	1.943	2.447	3.143	3.707	4.317	5.208	5.959	
7	0.711	1.415	1.895	2.365	2.998	3.499	4.029	4.785	5.408	
8	0.706	1.397	1.860	2.306	2.896	3.355	3.833	4.501	5.041	
9	0.703	1.383	1.833	2.262	2.821	3.250	3.690	4.297	4.781	
10	0.700	1.372	1.812	2.228	2.764	3.169	3.581	4.144	4.587	
11	0.697	1.363	1.796	2.201	2.718	3.106	3.497	4.025	4.437	
12	0.695	1.356	1.782	2.179	2.681	3.055	3.428	3.930	4.318	
13	0.694	1.350	1.771	2.160	2.650	3.012	3.372	3.852	4.221	
14	0.692	1.345	1.761	2.145	2.624	2.977	3.326	3.787	4.140	
15	0.691	1.341	1.753	2.131	2.602	2.947	3.286	3.733	4.073	
16	0.690	1.337	1.746	2.120	2.583	2.921	3.252	3.686	4.015	
17	0.689	1.333	1.740	2.110	2.567	2.898	3.222	3.646	3.965	
18	0.688	1.330	1.734	2.101	2.552	2.878	3.197	3.610	3.922	
19	0.688	1.328	1.729	2.093	2.539	2.861	3.174	3.579	3.883	
20	0.687	1.325	1.725	2.086	2.528	2.845	3.153	3.552	3.850	
21	0.686	1.323	1.721	2.080	2.518	2.831	3.135	3.527	3.819	
22	0.686	1.321	1.717	2.074	2.508	2.819	3.119	3.505	3.792	
23	0.685	1.319	1.714	2.069	2.500	2.807	3.104	3.485	3.767	
24	0.685	1.318	1.711	2.064	2.492	2.797	3.091	3.467	3.745	
25	0.684	1.316	1.708	2.060	2.485	2.787	3.078	3.450	3.725	
26	0.684	1.315	1.706	2.056	2.479	2.779	3.067	3.435	3.707	
27	0.684	1.314	1.703	2.052	2.473	2.771	3.057	3.421	3.690	$\frac{120}{\nu}$
28	0.683	1.313	1.701	2.048	2.467	2.763	3.047	3.408	3.674	
29	0.683	1.311	1.699	2.045	2.462	2.756	3.038	3.396	3.659	
30	0.683	1.310	1.697	2.042	2.457	2.750	3.030	3.385	3.646	4
40	0.681	1.303	1.684	2.021	2.423	2.704	2.971	3.307	3.551	3
60	0.679	1.296	1.671	2.000	2.390	2.660	2.915	3.232	3.460	2
120	0.677	1.289	1.658	1.980	2.358	2.617	2.860	3.160	3.373	1
∞	0.674	1.282	1.645	1.960	2.326	2.576	2.807	3.090	3.291	0

The function tabulated is t_Q defined by

$$\int_{t_Q}^{\infty} f(t)dt = Q; \quad f(t) = \frac{(\frac{1}{2}\nu - \frac{1}{2})!}{\sqrt{(\nu\pi)(\frac{1}{2}\nu - 1)!}} \cdot \frac{1}{(1 + t^2/\nu)^{(\nu+1)/2}}$$

where $f(t)$ is the probability density of the t-distribution.
Interpolation ν-wise should be linear in $120/\nu$ for $\nu > 30$.
Use (i) upper row for one tail-tests
(i) lower row for two tail-tests
If x is a random variable with the t-probability distribution for ν degrees of freedom, the probability that $x > t_Q$ is Q and the probability that $|x| > t_Q$ is 2Q.

The graph shows the form of the distribution for $\nu = 2$. The shaded area represents the probability Q. For large ν the distribution approximates to the normal distribution N(0,1), shown by the dotted line.