THE PUBLIC ACCOUNTANTS EXAMINATIONS BOARD

A Committee of the Council of ICPAU

CPA(U) EXAMINATIONS

LEVEL ONE

QUANTITATIVE TECHNIQUES - PAPER 2

SATURDAY 19 DECEMBER, 2020

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** questions 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 question paper and answer booklet, before attempting any question.

Attempt five of the six questions.

Question 1

(a) Explain the main uses of shapes of the following in the distribution of data.

(i) Skewness **(2 marks)**

(ii) Kurtosis **(2 marks)**

(b) The marks attained in a pre-entry examination of 1000 candidates were distributed as follows:

Marks	No. of candidates
0-<10	26
10-<20	64
20-<30	112
30-<40	170
40-<50	212
50-<60	192
60-<70	130
70-<80	62
80-<90	22
90-<100	10

The analysis of the performance reveals that 60% passed the exam, grade A was given to the top 10%, and grade B was given to the next 20% of the candidates. Furthermore it is understood that all the marks given were whole numbers.

Required:

(i) Construct a cumulative percentage frequency curve. **(6 marks)**

(ii) Obtain from the cumulative frequency curve an estimate of the least mark which candidates must have scored, to pass and to be in grade A. **(2 marks)**

(iii) Determine the interquartile range of the marks scored by candidates. **(2 marks)**

(c) Taxation and Finance examination scores for students of Smart College were computed and summarised in the table below.

	Mean	Median	Standard deviation
Taxation	85.17	82.50	4.48
Finance	85.05	89.00	4.25

Required:

(i) Determine Karl Pearson's coefficient of skewness for both scores.

(4 marks)

(ii) Comment on the performance in terms of spread and skewness in the above two courses.

(2 marks)

(Total 20 marks)

Question 2

(a) Given 3, 5, 7, 8, 9 are used to form 4 digit numbers.

Required:

Determine how many 4 digit numbers can be obtained and how many of these are greater than 8000.

(6 marks)

(b) A firm uses a machine to produce wedding rings with inside radius of approximately 10 mm. Over a long period of time, it was found that the actual radius was normally distributed with a mean of 10.2 mm and a standard deviation of 0.25 mm.

Required:

(i) Calculate an estimate of the percentage of wedding rings which have inside radius of less than 10.0 mm.

(3 marks)

(ii) In a sample of 500 wedding rings, estimate the number of wedding rings which have inside radius between 9.5 mm and 10.5 mm.

(4 marks)

(c) The number of injuries per working day of the week in a factory is known to follow a Poisson distribution. Given that in a sample of 500 workers 0.1% get injuries;

Required:

Find the probability that in;

(i) a particular week there would be exactly 2 injuries.

(3 marks)

(ii) week there will be 3 or more injuries.

(4 marks)

(Total 20 marks)

Question 3

(a) Describe the **four** main features of a control chart.

(4 marks)

(b) The following table refers to materials used by YY printers in a printing process to produce a magazine over the years 2018 and 2019

	2018		2019	
Materials	Unit price	Quantity	Unit price	Quantity
Reams of paper	12,000	100	11500	95
Ink	60,000	12	80,000	10
Master roll	75,000	2	60,000	3
Glue	10,000	16	12,000	12
Staples	500	40	600	50

Using 2018 as a base year compute Laspyres' price and Paasches' price index. Comment on your results in each case.

(8 marks)

(c) An accountant at JJ supermarket believes that the supermarket has an equal number of customers on each day of the week. The table below shows the number of customers who bought commodities from the supermarket in the first week of February.

Day	No of customers
Sunday	65
Monday	103
Tuesday	114
Wednesday	116
Thursday	115
Friday	112
Saturday	75

Required:

Using Chi – square test, determine whether there is enough evidence to support the accountants claim at 1% level of significance.

(8 marks)
(Total 20 marks)

Question 4

(a) Distinguish between mean squared error and mean absolute error.

(2 marks)

(b) The quality control inspector at Uganda drug authority inspected drug packaging items. Out of those inspected, only 10% of the items with defects were accepted and only 5% of the good quality items were

rejected. The overall production quality statistics showed that only 90% of the inspected items are good.

Required:

(i) Determine the probability that an item inspected was rejected when it was of good quality.

(1 mark)

(ii) Copy and complete the joint probability table below.

(5 marks)

Quality			
	Accept	Reject	Marginal Probability
Good			
Defect			
Marginal Probability			

(iii) Find the probability that the quality control inspector at Uganda drug authority will do a wrong check for the next packaging item.

(2 marks)

(c) The number of tourists visiting Uganda Museum for a period of 10 years was recorded as indicated in the table below:

Year	No of tourists (in thousands)
2010	303
2011	321
2012	342
2013	363
2014	406
2015	417
2016	464
2017	488
2018	495
2019	531

Required:

(i) Using the method of least squares determine the equation of the trend line.

(8 marks)

(ii) Determine the forecasts for the annual number of tourists for the year 2026.

(2 marks)

(Total 20 Marks)

Question 5

(a) Distinguish between marginal revenue and marginal cost.

(2 marks)

(b) BAK executive bus company travels daily from Kampala to Mityana and accommodates three categories of passengers: Business class, first class and economy class. Passengers are required to pay Shs 5,000, 7,000 and 4,000 respectively on the preferred category.

The bus can only accommodate 100 passengers on a single trip and on the first trip Shs 630,000 was collected as fares.

On the second trip, the business class recorded 10 more passengers; first class had 20 passengers less while the number in economy class had doubled as compared to the first trip.

Required:

(i) Determine the number of passengers who travelled in each category on the first bus trip.

(7 marks)

(ii) Determine the total income earned from the fares the bus company got on the second trip.

(2 marks)

(c) A firm has found out from past experience that its profit is given by

$P(q) = \frac{-q^3}{3} + 729q - 2{,}500$ where $0 \le q \le 35$

Required:

Find the;

(i) value of q that maximises profit.

(6 marks)

(ii) profit per unit product when this maximum is achieved.

(3 marks)

(Total 20 marks)

Question 6

(a) Kasokoso art craft workshop has three machine types for crafting (I), finishing (II) and spraying (III) installed at the their workshop. Machine types (I) and (II) are capable of being operated at most 12 hours whereas machine (III) must be operated for at least 5 hours a day.
Currently the workshop produces only two types of artwork (M and N) and each requires using all the three types of machines. The number of hours required to produce 1 unit of each artwork type M and N on the three machines are indicated in the table below:

Item	Number of hours required on machines		
	I	II	III
M	1	2	1
N	2	1	1.25

The workshop makes a profit of Shs 600,000 and Shs 400,000 on each of the items M and N produced respectively.

Required:

(i) Formulate the above problem as a linear programming problem.

(4 marks)

(ii) Using the graphical method, determine how many items of each type the workshop must produce so as to maximise profits assuming that all produced items are sold.

(6 marks)

(iii) Determine the maximum profit the workshop would reap.

(2 marks)

(b) The table below shows details of a project schedule for Riley Consultancy Firm in relation to their terms of reference.

Activity	Preceding Activity	Normal time (in weeks)	Crash time (in weeks)	Normal cost "million"	Crash cost "million"
A	-	4	1	30	36
B	-	3	2	20	30
C	A,B	3	1	15	22
D	B	7	4	21	24
E	C,D	5	3	16	40
F	E	2	1	28	35

Required:

(i) Draw a network diagram for the project and use it to determine the critical path and project duration.

(4 marks)

(ii) Obtain the total cost of the project if the project duration is reduced by 2 weeks through crashing the activities along the critical path.

(4 marks)

(Total 20 marks)

FORMULAE

1.	Combination ${}^nC_r = \frac{n!}{(n-r)!r!}$			
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	=	crash cost – normal cost / 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 $= Lb + \left(\frac{\frac{N}{2} - Cfb}{fm} \right) C$				
17.	Mode $= lm + \left(\frac{d_1}{d_1 + d_2} \right) C$				
18.	Variance $Var(x) = \frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2$				
19.	Standard deviation	$\delta = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$		$= \sqrt{\frac{\sum f(x-\bar{x})^2}{\sum f}}$	
20.	Sample standard deviation	$s = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$			
21.	Least squares regression equation of y on x is given by; $y = a + bx$				
	Where; $b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2}$		and	$a = \frac{\sum y}{n} - \frac{b\sum x}{n}$	
22.	Least squares regression equation of x on y is given by; x = c +dy				
	Where $c = \frac{\sum x}{n} - \frac{d\sum y}{n}$		and	$d = \frac{n\sum xy - \sum x \sum y}{n\sum y^2 - (\sum y)^2}$	
23.	Standardising normal.			$z = \frac{\bar{x} - \mu}{\sigma}$	
24.	Central Limit theorem			$\frac{\overline{x - x_2}}{\sqrt{\frac{\sigma_1^2 + \sigma_2^2}{n_1 + n_2}}}$	
24.	Confidence interval for sample mean $= \bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$				
25.	$\chi^2 = \sum \frac{(O-E)^2}{E}$				
26.	Confidence interval of proportion $= p \pm z_{\alpha/2} \sqrt{\frac{pq}{n}}$				
27.	Pearson coefficient of skewness	$Sk = \frac{(\bar{x} - \text{mode})}{s_d}$	o r	$Sk = \frac{3\left(\bar{x} - median\right)}{s_d}$	
28.	Expectation = $\sum xP(X = x)$				

29.	Laspeyres' price index = $\frac{\sum(p_1 \times q_0)}{\sum(q_0 \times p_0)} \times 100$
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.	$Poisson Model P\left(X = x\right) = e^{-\lambda} \frac{\lambda^x}{x!}$
38.	Extrapolation $y_x = y_1 + (y_2 - y_1)(\frac{x - x_1}{x_2 - x_1})$
39.	Interpolation $y_x = y_1 + (x - x_1)(\frac{y_2 - y_1}{x_2 - x_1})$

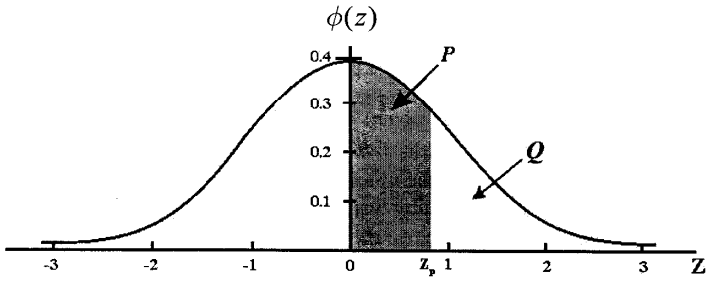
CUMULATIVE NORMAL DISTRIBUTION $P(z)$

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. $P(o < Z < z_p) = P$(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

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

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.