UNIVERSITY EXAMINATIONS

UNIVERSITEITSEKSAMENS

UNISA university of south africa

IOP2601

October/November 2016
Oktober/November 2016

ORGANISATIONAL RESEARCH METHODOLOGY
ORGANISASIE NAVORSINGSMETODOLOGIE

Duration . 2 Hours
Tydsduur : 2 Uur

70 Marks
70 Punte

EXAMINERS / EKSAMINATORE :

FIRST / EERSTE	MS/ME NN BEKWA	DR RT TLADINYANE
SECOND / TWEEDE	PROF FVN CILLIERS	

Use of a non-programmable pocket calculator is permissible.
Gebruik van 'n nie-programmeerbare sakrekenaar is toelaatbaar.

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Toeboekeksamen.

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This examination question paper consists of 22 pages
Hierdie eksamenvraestel bestaan uit 22 bladsye.

ENGLISH QUESTIONS START ON PAGE 11

AFRIKAANSE VRAE BEGIN OP BLADSY 17.

ANSWER ALL THE QUESTIONS

BEANTWOORD AL DIE VRAE.

LIST OF FORMULAS

$$midpoint\ of\ class\ interval = RLL + \frac{(RUL - RLL)}{2}$$

$$percentile\ rank = \%below + \frac{score - RLL}{class\ int\ width}\ (interval\ \%)$$

$$score\ of\ p = RLL + \frac{PR - \%below}{interval\ \%}\ (interval\ width)$$

$Mo = Most\ frequently\ occuring\ score$

$$Median\ location\ = \frac{N+1}{2}$$

$$\overline{X} = \frac{\Sigma X}{N} \qquad \overline{Y} = \frac{\Sigma Y}{N}$$

$Range = Highest\ score\ minus\ lowest\ score$

$$s_x^2 = \frac{\Sigma X^2 - \frac{(\Sigma X)^2}{N}}{N-1} \qquad s_x = \sqrt{s_x^2}$$

$$s_y^2 = \frac{\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}}{N-1} \qquad s_y = \sqrt{s_y^2}$$

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

$$b = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{N\Sigma X^2 - (\Sigma X)^2} \qquad a = \overline{Y} - b\overline{X}$$

$$\hat{Y} = bX + a$$

$$z = \frac{X - \mu}{\sigma}$$

$$t = \frac{\overline{D} - 0}{\frac{S_D}{\sqrt{N}}} \qquad df = N - 1$$

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}} \qquad df = N_1 + N_2 - 2$$

$$S_p^2 = \frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2} \qquad t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_p^2}{N_1} + \frac{s_p^2}{N_2}}}$$

$$SS_{total} = \Sigma X^2 - \frac{(\Sigma X)^2}{N} \qquad df_{total} = N - 1$$

$$SS_{group} = n\Sigma(\overline{X}_j - \overline{\overline{X}}..)^2 \qquad df_{group} = k - 1$$

$$SS_{error} = SS_{total} - SS_{group} \qquad df_{error} = k(n - 1)$$

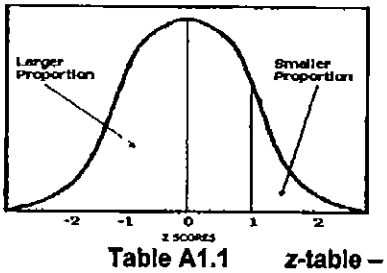
$$MS_{group} = \frac{SS_{group}}{df_{group}} \qquad MS_{error} = \frac{SS_{error}}{df_{error}}$$

$$F = \frac{MS_{group}}{MS_{error}}$$

$$\chi^2 = \Sigma\frac{(O - E)^2}{E} \qquad E_{ij} = \frac{R_i C_j}{N}$$

$$df = k - 1 \qquad df = (R - 1)(C - 1)$$

LIST OF TABLES



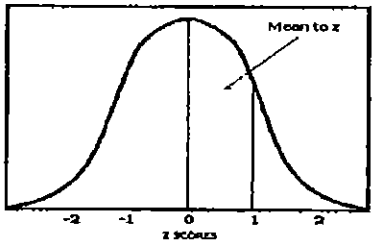


Table A1.1 z-table – the standard normal distribution

Z	Smaller *p*	Larger *p*	Mean to *z*	z	Smaller *p*	Larger *p*	Mean to *z*	z	Smaller *p*	Larger *p*	Mean to *z*
0	0 50000	0 50000	0 00000	0 65	0 25785	0 74215	0 24215	1.3	0 09680	0 90320	0 40320
0 01	0 49601	0 50399	0 00399	0.66	0 25463	0 74537	0 24537	1.31	0 09510	0 90490	0 40490
0 02	0 49202	0 50798	0 00798	0.67	0 25143	0 74857	0 24857	1.32	0 09342	0 90658	0 40658
0.03	0 48803	0 51197	0 01197	0.68	0 24825	0 75175	0 25175	1.33	0 09176	0 90824	0 40824
0.04	0 48405	0 51595	0 01595	0.69	0 24510	0 75490	0 25490	1.34	0 09012	0 90988	0 40988
0 05	0 48006	0 51994	0 01994	0.7	0 24196	0 75804	0 25804	1.35	0 08851	0 91149	0 41149
0.06	0 47608	0 52392	0 02392	0 71	0 23885	0 76115	0 26115	1.36	0 08692	0 91308	0 41308
0.07	0 47210	0 52790	0 02790	0.72	0 23576	0 76424	0 26424	1.37	0 08534	0 91466	0 41466
0 08	0 46812	0 53188	0 03188	0.73	0 23270	0 76730	0 26730	1.38	0 08379	0 91621	0 41621
0.09	0 46414	0 53586	0 03586	0 74	0 22965	0 77035	0 27035	1.39	0 08226	0 91774	0 41774
0.1	0 46017	0 53983	0 03983	0 75	0 22663	0 77337	0 27337	1.4	0 08076	0 91924	0 41924
0.11	0 45620	0 54380	0 04380	0.76	0 22363	0 77637	0 27637	1.41	0 07927	0 92073	0 42073
0.12	0 45224	0 54776	0 04776	0 77	0 22065	0 77935	0 27935	1.42	0 07780	0 92220	0 42220
0.13	0 44828	0 55172	0 05172	0.78	0 21770	0 78230	0 28230	1.43	0 07636	0 92364	0 42364
0 14	0 44433	0 55567	0 05567	0 79	0 21476	0 78524	0 28524	1 44	0 07493	0 92507	0 42507
0 15	0 44038	0 55962	0 05962	0.8	0 21186	0 78814	0 28814	1.45	0 07353	0 92647	0 42647
0.16	0 43644	0 56356	0 06356	0 81	0 20897	0 79103	0 29103	1.46	0 07215	0 92785	0 42785
0.17	0 43251	0 56749	0 06749	0.82	0 20611	0 79289	0 29289	1 47	0 07078	0 92922	0 42922
0.18	0 42858	0 57142	0 07142	0 83	0 20327	0 79673	0 29673	1 48	0 06944	0 93056	0 43056
0.19	0 42465	0 57535	0 07535	0 84	0 20045	0 79955	0 29955	1 49	0 06811	0 93189	0 43189
0.2	0 42074	0 57926	0 07926	0.85	0 19766	0 80234	0 30234	1 5	0 06681	0 93319	0 43319
0.21	0 41683	0 58317	0 08317	0.86	0 19489	0 80511	0 30511	1.51	0 06552	0 93448	0 43448
0.22	0 41294	0 58706	0 08706	0.87	0 19215	0 80785	0 30785	1.52	0 06426	0 93574	0 43574
0.23	0 40905	0 59095	0 09095	0.88	0 18943	0 81057	0 31057	1.53	0 06301	0 93699	0 43699
0.24	0 40517	0 59483	0 09483	0.89	0 18673	0 81327	0 31327	1.54	0 06178	0 93822	0 43822
0.25	0 40129	0 59871	0 09871	0 9	0 18406	0 81594	0 31594	1.55	0 06057	0 93943	0 43943
0.26	0 39743	0 60257	0 10257	0.91	0 18141	0 81859	0 31859	1.56	0 05938	0 94062	0 44062
0.27	0 39358	0 60642	0 10642	0 92	0 17879	0 82121	0 32121	1.57	0 05821	0 94179	0 44179
0.28	0 38974	0 61026	0 11026	0.93	0 17619	0 82381	0 32381	1.58	0 05705	0 94295	0 44295
0.29	0 38591	0 61409	0 11409	0 94	0 17361	0 82639	0 32639	1.59	0 55920	0 94408	0 44408
0.3	0.38209	0 61791	0 11791	0.95	0 17106	0 82894	0 32894	1.6	0 05480	0 94520	0 44520
0.31	0 37828	0 62172	0 12172	0.96	0 16853	0 83147	0 33147	1.61	0 05370	0 94630	0 44630
0.32	0 37448	0 62552	0 12552	0.97	0 16602	0 83398	0 33398	1.62	0 05262	0 94738	0 44738
0.33	0 37070	0 62930	0 12930	0.98	0 16354	0 83646	0 33646	1.63	0 05155	0 94845	0 44845
0.34	0 36693	0 63307	0 13307	0 99	0 16109	0 83891	0 33891	1.64	0 05050	0 94950	0 44950
0.35	0 36317	0 63683	0 13683	1	0 15866	0 84134	0 34134	1.65	0 04947	0 95053	0 45053
0.36	0 35942	0 64058	0 14058	1 01	0 15625	0 84375	0 34375	1.66	0 04846	0 95154	0 45154
0.37	0 35569	0 64431	0 14431	1.02	0 15386	0 84614	0 34614	1.67	0 04746	0 95254	0 45254
0.38	0 35197	0 64803	0 14803	1.03	0 15151	0 84849	0 34849	1.68	0 04648	0 95352	0 45352
0.39	0 34827	0 65173	0 15173	1 04	0 14917	0 85083	0 35083	1 69	0 04551	0 95449	0 45449
0.4	0.34458	0 65542	0 15542	1.05	0 14686	0 85314	0 35314	1 7	0 04457	0 95543	0 45543
0.41	0 34090	0 65910	0 15910	1.06	0 14457	0 85543	0 35543	1.71	0 04363	0 95637	0 45637
0.42	0 33724	0 66276	0 16276	1 07	0 14231	0 85769	0 35769	1 72	0 04272	0 95728	0 45728
0.43	0 33360	0 66640	0 16640	1.08	0 14007	0 85993	0 35993	1.73	0 04182	0 95818	0 45818
0.44	0 32991	0 67003	0 17003	1.09	0 13786	0 86214	0 36214	1.74	0 04093	0 95907	0 45907
0.45	0 32636	0 67364	0 17364	1 1	0 13567	0 86433	0 36433	1 75	0 04006	0 95994	0 45994
0.46	0 32276	0 67724	0 17724	1.11	0 13350	0 86650	0 36650	1 76	0 03920	0 96080	0 46080
0 47	0 31918	0 68082	0 18082	1 12	0 13136	0 86864	0 36864	1.77	0 03836	0 96164	0 46164
0.48	0 31561	0 68439	0 18439	1 13	0 12924	0 87076	0 37076	1.78	0 03754	0 96246	0 46246
0.49	0 31207	0 68793	0 18793	1.14	0 12714	0 87286	0 37286	1.79	0 03673	0 96327	0 46327
0.5	0 30854	0 69146	0 19146	1.15	0 12507	0 87493	0 37493	1.8	0 03593	0 96407	0 46407
0.51	0 30503	0 69497	0 19497	1 16	0 12302	0 87698	0 37698	1.81	0 03515	0 96485	0 46485
0.52	0 30153	0 69847	0 19847	1.17	0 12100	0 87900	0 37900	1.82	0 03438	0 96562	0 46562
0.53	0 29806	0 70194	0 20194	1 18	0 11900	0 88100	0 38100	1 83	0 03362	0 96638	0 46638
0.54	0 29460	0 70540	0 20540	1 19	0 11702	0 88289	0 38289	1.84	0 03288	0 96712	0 46712
0.55	0 29116	0 70884	0.20884	1.2	0 11507	0 88493	0 38493	1.85	0 03216	0 96784	0 46784
0 56	0 28774	0 71226	0 21226	1 21	0 11314	0 88686	0 38686	1 86	0 03144	0 96856	0 46856
0.57	0 28434	0 71566	0.21566	1.22	0 11123	0 88877	0 38877	1.87	0 03074	0 96926	0 46926
0.58	0 28096	0 71904	0 21904	1.23	0 10935	0 89065	0 39065	1.88	0 03005	0 96995	0 46995
0.59	0 27760	0 72240	0.22240	1.24	0 10416	0 89251	0 39251	1 89	0 02938	0 97062	0 47062
0.6	0 27425	0 72575	0 22575	1.25	0 10565	0 89435	0 39435	1.9	0 02872	0 97128	0 47128
0 61	0 27093	0 72907	0 22907	1.26	0 10383	0 89617	0 39617	1.91	0 02807	0 97193	0 47193
0.62	0 26763	0 73237	0.23237	1.27	0 10204	0 89796	0 39796	1 92	0 02743	0 97257	0 47257
0.63	0 26435	0 73565	0.23565	1.28	0 10027	0 89973	0 39973	1 93	0 02680	0 97320	0 47320
0.64	0 26109	0 73891	0.23891	1.29	0 09853	0 90147	0 40147	1.94	0 02619	0 97381	0 47381

Table A1.1 z-table – the standard normal distribution (*continued*)

z	Smaller p	Larger p	Mean to z
1.95	0.02559	0.97441	0.47441
1.96	0.02500	0.97500	0.47500
1.97	0.02442	0.97558	0.47558
1.98	0.02385	0.97615	0.47615
1.99	0.02330	0.97670	0.47670
2	0.02275	0.97725	0.47725
2.01	0.02222	0.97778	0.47778
2.02	0.02169	0.97831	0.47831
2.03	0.02118	0.97882	0.47882
2.04	0.02068	0.97932	0.47932
2.05	0.02018	0.97982	0.47982
2.06	0.01970	0.98030	0.48030
2.07	0.01923	0.98077	0.48077
2.08	0.01876	0.98124	0.48124
2.09	0.01831	0.98169	0.48169
2.1	0.01786	0.98214	0.48214
2.11	0.01743	0.98251	0.48251
2.12	0.01700	0.98300	0.48300
2.13	0.06590	0.98341	0.48341
2.14	0.01618	0.98382	0.48382
2.15	0.01780	0.98422	0.48422
2.16	0.01539	0.98461	0.48461
2.17	0.01500	0.98500	0.48500
2.18	0.01463	0.98537	0.48537
2.19	0.01426	0.98574	0.48574
2.2	0.01390	0.98610	0.48610
2.21	0.01355	0.98645	0.48645
2.22	0.01321	0.98679	0.48679
2.23	0.01287	0.98713	0.48713
2.24	0.01255	0.98745	0.48745
2.25	0.01222	0.98778	0.48778
2.26	0.01191	0.98809	0.48809
2.27	0.01160	0.98840	0.48840
2.28	0.01130	0.98870	0.48870
2.29	0.01101	0.98899	0.48899
2.3	0.01072	0.98928	0.48928
2.31	0.01044	0.98956	0.48956
2.32	0.01017	0.98983	0.48983
2.33	0.00990	0.99010	0.49010
2.34	0.00964	0.99036	0.49036
2.35	0.00939	0.99061	0.49061
2.36	0.00914	0.99086	0.49086
2.37	0.00889	0.99111	0.49111
2.38	0.00866	0.99134	0.49134
2.39	0.00842	0.99158	0.49158
2.4	0.00820	0.99180	0.49180
2.41	0.00798	0.99202	0.49202
2.42	0.00776	0.99224	0.49224
2.43	0.00755	0.99245	0.49245
2.44	0.00734	0.99266	0.49266
2.45	0.00714	0.99286	0.49286
2.46	0.00695	0.99305	0.49305
2.47	0.00676	0.99324	0.49324
2.48	0.00657	0.99343	0.49343
2.49	0.00639	0.99361	0.49361
2.5	0.00621	0.99379	0.49379
2.51	0.00604	0.99396	0.49396
2.52	0.00587	0.99413	0.49413
2.53	0.00570	0.99430	0.49430
2.54	0.00554	0.99446	0.49446
2.55	0.00539	0.99461	0.49461
2.56	0.00523	0.99477	0.49477
2.57	0.00508	0.99492	0.49492
2.58	0.00494	0.99506	0.49506
2.59	0.00480	0.99520	0.49520
2.6	0.00466	0.99534	0.49534
2.61	0.00453	0.99547	0.49547
2.62	0.00440	0.99560	0.49560
2.63	0.00427	0.99573	0.49573
2.64	0.00415	0.99585	0.49585
2.65	0.00402	0.99598	0.49598
2.66	0.00391	0.99609	0.49609
2.67	0.00379	0.99621	0.49621
2.68	0.00368	0.99632	0.49632
2.69	0.00357	0.99643	0.49643
2.7	0.00347	0.99653	0.49653
2.71	0.00336	0.99664	0.49664
2.72	0.00324	0.99674	0.49674
2.73	0.00317	0.99683	0.49683
2.74	0.00307	0.99693	0.49693
2.75	0.00298	0.99702	0.49702
2.76	0.00289	0.99711	0.49711
2.77	0.00280	0.99720	0.49720
2.78	0.00272	0.99728	0.49728
2.79	0.00264	0.99736	0.49736
2.8	0.00256	0.99744	0.49744
2.81	0.00248	0.99752	0.49752
2.82	0.00240	0.99760	0.49760
2.83	0.00233	0.99767	0.49767
2.84	0.00226	0.99774	0.49774
2.85	0.00219	0.99781	0.49781
2.86	0.00212	0.99788	0.49788
2.87	0.00205	0.99795	0.49795
2.88	0.00199	0.99801	0.49801
2.89	0.00193	0.99807	0.49807
2.9	0.00187	0.99813	0.49813
2.91	0.00181	0.99819	0.49819
2.92	0.00175	0.99825	0.49825
2.93	0.00169	0.99831	0.49831
2.94	0.00164	0.99836	0.49836
2.95	0.00159	0.99841	0.49841
2.96	0.00154	0.99846	0.49846
2.97	0.00149	0.99851	0.49851
2.98	0.00144	0.99856	0.49856
2.99	0.00139	0.99861	0.49861
3	0.00135	0.99865	0.49865
3.01	0.00131	0.99869	0.49869
3.02	0.00126	0.99874	0.49874
3.03	0.00122	0.99878	0.49878
3.04	0.00118	0.99882	0.49882
3.05	0.00114	0.99886	0.49886
3.06	0.00111	0.99889	0.49889
3.07	0.00107	0.99893	0.49893
3.08	0.00104	0.99896	0.49896
3.09	0.00100	0.99900	0.49900
3.1	0.00097	0.99903	0.49903
3.11	0.00094	0.99906	0.49906
3.12	0.00090	0.99910	0.49910
3.13	0.00087	0.99913	0.49913
3.14	0.00084	0.99916	0.49916
3.15	0.00082	0.99918	0.49918
3.16	0.00079	0.99921	0.49921
3.17	0.00076	0.99924	0.49924
3.18	0.00074	0.99926	0.49926
3.19	0.00071	0.99929	0.49929
3.2	0.00069	0.99931	0.49931
3.21	0.00066	0.99934	0.49934
3.22	0.00064	0.99936	0.49936
3.23	0.00062	0.99938	0.49938
3.24	0.00060	0.99940	0.49940
3.3	0.00048	0.99952	0.49952
3.4	0.00034	0.99966	0.49966
3.5	0.00023	0.99977	0.49977
3.6	0.00016	0.99984	0.49984
3.7	0.00011	0.99989	0.49989
3.8	0.00007	0.99993	0.49993
3.9	0.00005	0.99995	0.49995
4	0.00003	0.99997	0.49997
4.1	0.00002	0.99998	0.49998
4.2	0.00001	0.99999	0.49999

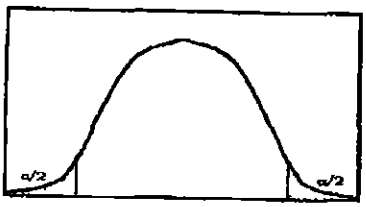
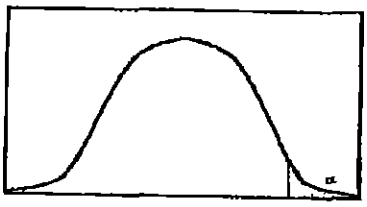


Table A1.2: *t*-table – values of the *t* distribution for varying degrees of freedom (*df*) and α



α for two-tailed test		0.001	0.01	0.02	0.05	0.1	0.2	0.3
α for one-tailed test		0.0005	0.005	0.01	0.025	0.05	0.1	0.15
DEGREES OF FREEDOM (df)	1	636.5776	63.6559	31.8210	12.7062	6.3137	3.0777	1.9626
	2	31.5998	9.9250	6.9645	4.3027	2.9200	1.8856	1.3862
	3	12.9244	5.8408	4.5407	3.1824	2.3534	1.6377	1.2498
	4	8.6101	4.6041	3.7469	2.7765	2.1318	1.5332	1.1896
	5	6.8685	4.0321	3.3649	2.5706	2.0150	1.4759	1.1558
	6	5.9587	3.7074	3.1427	2.4469	1.9432	1.4398	1.1342
	7	5.4081	3.4995	2.9979	2.3646	1.8946	1.4149	1.1192
	8	5.0414	3.3554	2.8965	2.3060	1.8595	1.3968	1.1081
	9	4.7809	3.2498	2.8214	2.2622	1.8331	1.3830	1.0997
	10	4.5868	3.1693	2.7638	2.2281	1.8125	1.3722	1.0931
	11	4.4369	3.1058	2.7181	2.2010	1.7959	1.3634	1.0877
	12	4.3178	3.0545	2.6810	2.1788	1.7823	1.3562	1.0832
	13	4.2209	3.0123	2.6503	2.1604	1.7709	1.3502	1.0795
	14	4.1403	2.9768	2.6245	2.1448	1.7613	1.3450	1.0763
	15	4.0728	2.9467	2.6025	2.1315	1.7531	1.3406	1.0735
	16	4.0149	2.9208	2.5835	2.1199	1.7459	1.3368	1.0711
	17	3.9651	2.8982	2.5669	2.1098	1.7396	1.3334	1.0690
	18	3.9217	2.8784	2.5524	2.1009	1.7341	1.3304	1.0672
	19	3.8833	2.8609	2.5395	2.0930	1.7291	1.3277	1.0655
	20	3.8496	2.8453	2.5280	2.0860	1.7247	1.3253	1.0640
	21	3.8193	2.8314	2.5176	2.0796	1.7207	1.3232	1.0627
	22	3.7922	2.8188	2.5083	2.0739	1.7171	1.3212	1.0614
	23	3.7676	2.8073	2.4999	2.0687	1.7139	1.3195	1.0603
	24	3.7454	2.7970	2.4922	2.0639	1.7109	1.3178	1.0593
	25	3.7251	2.7874	2.4851	2.0595	1.7081	1.3163	1.0584
	26	3.7067	2.7787	2.4786	2.0555	1.7056	1.3150	1.0575
	27	3.6895	2.7707	2.4727	2.0518	1.7033	1.3137	1.0567
	28	3.6739	2.7633	2.4671	2.0484	1.7011	1.3125	1.0560
	29	3.6595	2.7564	2.4620	2.0452	1.6991	1.3114	1.0553
	30	3.6460	2.7500	2.4573	2.0423	1.6973	1.3104	1.0547
	31	3.6335	2.7440	2.4528	2.0395	1.6955	1.3095	1.0541
	32	3.6218	2.7385	2.4487	2.0369	1.6939	1.3086	1.0535
	33	3.6109	2.7333	2.4448	2.0345	1.6924	1.3077	1.0530
	34	3.6007	2.7284	2.4411	2.0322	1.6909	1.3070	1.0525
	35	3.5911	2.7238	2.4377	2.0301	1.6896	1.3062	1.0520
	36	3.5821	2.7195	2.4345	2.0281	1.6883	1.3055	1.0516
	37	3.5737	2.7154	2.4314	2.0262	1.6871	1.3049	1.0512
	38	3.5657	2.7116	2.4286	2.0244	1.6860	1.3042	1.0508
	39	3.5581	2.7079	2.4258	2.0227	1.6849	1.3036	1.0504
	40	3.5510	2.7045	2.4233	2.0211	1.6839	1.3031	1.0500
	45	3.5203	2.6896	2.4121	2.0141	1.6794	1.3007	1.0485
	50	3.4960	2.6778	2.4033	2.0086	1.6759	1.2987	1.0473
	55	3.4765	2.6682	2.3961	2.0040	1.6730	1.2971	1.0463
	60	3.4602	2.6603	2.3901	2.0003	1.6706	1.2958	1.0455
	100	3.3905	2.6259	2.3642	1.9840	1.6602	1.2901	1.0418
	1000	3.3002	2.5807	2.3301	1.9623	1.6464	1.2824	1.0370

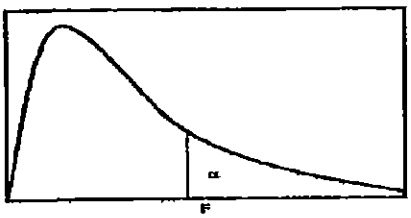


Table A1.4: Table of the F-distribution: $\alpha = 0.05$

Numerator degrees of freedom (df)

Denominator degrees of freedom (df)	1	2	3	4	5	6	7	8	9	10	15	20	25	30	40	50	100
1	161 45	199 50	215 71	224 58	230 16	233 99	236 77	238 88	240 54	241 88	245 95	248 01	249 26	250 10	251 14	251 77	253 04
2	18 51	19 00	19 16	19 25	19 30	19 33	19 35	19 37	19 38	19 40	19 43	19 45	19 46	19 46	19 47	19 48	19 49
3	10 13	9 55	9 28	9 12	9 01	8 94	8 89	8 85	8 81	8 79	8 70	8 66	8 63	8 62	8 59	8 58	8 55
4	7 71	6 94	6 59	6 39	6 26	6 16	6 09	6 04	6 00	5 96	5 86	5 80	5 77	5 75	5 72	5 70	5 66
5	6 61	5 79	5 41	5 19	5 05	4 95	4 88	4 82	4 77	4 74	4 62	4 56	4 52	4 50	4 46	4 44	4 41
6	5 99	5 14	4 76	4 53	4 39	4 28	4 21	4 15	4 10	4 06	3 94	3 87	3 83	3 81	3 77	3 75	3 71
7	5 59	4 74	4 35	4 12	3 97	3 87	3 79	3 73	3 68	3 64	3 51	3 44	3 40	3 38	3.34	3 32	3.27
8	5 32	4 46	4 07	3 84	3 69	3 58	3 50	3 44	3 39	3 35	3 22	3 15	3 11	3 08	3 04	3 02	2 97
9	5 12	4 26	3 86	3 63	3 48	3 37	3 29	3 23	3 18	3 14	3 01	2 94	2 89	2 86	2 83	2 80	2 76
10	4 96	4 10	3 71	3 48	3 33	3 22	3 14	3 07	3 02	2 98	2 85	2 77	2 73	2 70	2 66	2 64	2 59
11	4 84	3 98	3 59	3 36	3 20	3 09	3 01	2 95	2 90	2 85	2 72	2 65	2 60	2 57	2 53	2 51	2 46
12	4 75	3 89	3 49	3 26	3 11	3 00	2 91	2 85	2 80	2 75	2 62	2 54	2 50	2 47	2 43	2 40	2 35
13	4 67	3 81	3 41	3 18	3 03	2 92	2 83	2 77	2 71	2 67	2 53	2 46	2 41	2 38	2 34	2 31	2 26
14	4 60	3 74	3 34	3 11	2 96	2 85	2 76	2 70	2 65	2 60	2 46	2 39	2 34	2 31	2 27	2 24	2 19
15	4 54	3 68	3 29	3 06	2 90	2 79	2 71	2 64	2 59	2 54	2 40	2 33	2 28	2 25	2 20	2 18	2 12
16	4 49	3 63	3 24	3 01	2 85	2 74	2 66	2 59	2 54	2 49	2 35	2 28	2 23	2 19	2.15	2 12	2 07
17	4 45	3 59	3 20	2 96	2 81	2 70	2 61	2 55	2 49	2 45	2 31	2 23	2 18	2 15	2.10	2 08	2 02
18	4 41	3 55	3 16	2 93	2 77	2 66	2 58	2 51	2 46	2 41	2 27	2 19	2 14	2 11	2 06	2 04	1 98
19	4 38	3 52	3 13	2 90	2 74	2 63	2 54	2 48	2 42	2 38	2 23	2 16	2 11	2 07	2 03	2 00	1 94
20	4 35	3 49	3 10	2 87	2 71	2 60	2 51	2 45	2 39	2 35	2 20	2 12	2 07	2 04	1 99	1 97	1 91
21	4 32	3 47	3 07	2 84	2 68	2 57	2 49	2 42	2 37	2 32	2 18	2 10	2 05	2 01	1 96	1 94	1 88
22	4 30	3 44	3 05	2 82	2 66	2 55	2 46	2 40	2 34	2 30	2 15	2 07	2 02	1 98	1 94	1 91	1 85
23	4 28	3 42	3 03	2 80	2 64	2 53	2 44	2 37	2 32	2 27	2 13	2 05	2 00	1 96	1 91	1 88	1 82
24	4 26	3 40	3 01	2 78	2 62	2 51	2 42	2 36	2 30	2 25	2 11	2 03	1 97	1 94	1 89	1 86	1 80
25	4 24	3 39	2 99	2 76	2 60	2 49	2 40	2 34	2 28	2 24	2 09	2 01	1 96	1 92	1 87	1 84	1 78
26	4 23	3 37	2 98	2 74	2 59	2 47	2 39	2 32	2 27	2 22	2 07	1 99	1 94	1 90	1 85	1 82	1 76
27	4 21	3 35	2 96	2 73	2 57	2 46	2 37	2 31	2 25	2 20	2 06	1 97	1 92	1 88	1 84	1 81	1 74
28	4 20	3 34	2 95	2 71	2 56	2 45	2 36	2 29	2 24	2 19	2 04	1 96	1 91	1 87	1 82	1 79	1 73
29	4 18	3 33	2 93	2 70	2 55	2 43	2 35	2 28	2 22	2 18	2 03	1 94	1 89	1 85	1 81	1 77	1 71
30	4 17	3 32	2 92	2 69	2 53	2 42	2 33	2 27	2 21	2 16	2 01	1 93	1 88	1 84	1 79	1 76	1 70
35	4 12	3 27	2 87	2 64	2 49	2 37	2 29	2 22	2 16	2 11	1 96	1 88	1 82	1 79	1 74	1 70	1 63
40	4 08	3 23	2 84	2 61	2 45	2 34	2 25	2 18	2 12	2 08	1 92	1 84	1 78	1 74	1 69	1 66	1 59
45	4 06	3 20	2 81	2 58	2 42	2 31	2 22	2 15	2 10	2 05	1 89	1 81	1 75	1 71	1 66	1 63	1 55
50	4 03	3 18	2 79	2 56	2 40	2 29	2 20	2 13	2 07	2 03	1 87	1 78	1 73	1 69	1 63	1 60	1 52
60	4 00	3 15	2 76	2 53	2 37	2 25	2 17	2 10	2 04	1 99	1 84	1 75	1 69	1 65	1 59	1 56	1 48
70	3 98	3 13	2 74	2 50	2 35	2 23	2 14	2 07	2 02	1 97	1 81	1 72	1 66	1 62	1 57	1 53	1 45
80	3 96	3 11	2 72	2 49	2 33	2.21	2 13	2 06	2 00	1 95	1 79	1 70	1 64	1 60	1 54	1 51	1 43
90	3 95	3 10	2 71	2 47	2 32	2 20	2 11	2 04	1 99	1 94	1 78	1 69	1 63	1 59	1 53	1 49	1 41
100	3 94	3 09	2 70	2 46	2 31	2 19	2 10	2 03	1 97	1 93	1 77	1 68	1 62	1 57	1 52	1 47	1 39
200	3 89	3 04	2 65	2 42	2 26	2 14	2 06	1 98	1 93	1 88	1 72	1 62	1 56	1 52	1 46	1 41	1 32
300	3 87	3 03	2 63	2 40	2 24	2 13	2 04	1 97	1 91	1 86	1 70	1 61	1 54	1 50	1 43	1 39	1 30
400	3 86	3 02	2 63	2 39	2 24	2 12	2 03	1 96	1 90	1 85	1 69	1 60	1 53	1 49	1 42	1 38	1 28
500	3 86	3 01	2 62	2 39	2 23	2 12	2 03	1 96	1 90	1 85	1 69	1 59	1 53	1 48	1 42	1 38	1 28
1000	3 85	3 00	2 61	2 38	2 22	2 11	2 02	1 95	1 89	1 84	1 68	1 58	1 52	1 47	1 41	1 36	1 26
10000	3 84	3 00	2 61	2 37	2 21	2 10	2 01	1 94	1 88	1 83	1 67	1 57	1 51	1 46	1 40	1 35	1 25

Table A1.5 Table of the F-distribution: $\alpha = 0.01$

Numerator degrees of freedom (df)

Denominator degrees of freedom (df)	1	2	3	4	5	6	7	8	9	10	15	20	25	30	40	50	100
1	4052 18	4999 50	5403 35	5624 58	5763 65	5858 99	5928 36	5981 07	6022 47	6055 85	6157 29	6208 73	6239 86	6260 65	6286 78	6286 40	6333 90
2	98 50	99 00	99 17	99 25	99 30	99 33	99 36	99 37	99 39	99 40	99 43	99 45	99 46	99 47	99 47	99 48	99 49
3	34 12	30 82	29 46	28 71	28 24	27 91	27 67	27 49	27 35	27 23	26 87	26 69	26 58	26 51	26 41	26 41	26 24
4	21.20	18 00	16 69	15 98	15 52	15.21	14 98	14 80	14 66	14 55	14.20	14 02	13 91	13 84	13 75	13 75	13 58
5	16 26	13 27	12 06	11 39	10 97	10 67	10 46	10 29	10 16	10 05	9 72	9 55	9 45	9 38	9 29	9 29	9 13
6	13 75	10 93	9 78	9 15	8 75	8 47	8 26	8 10	7 98	7 87	7 56	7 40	7 30	7 23	7 14	7 14	6 99
7	12 25	9 55	8 45	7 85	7 46	7 19	6 99	6 84	6 72	6 62	6 31	6 16	6 06	5 99	5 91	5 91	5 75
8	11 26	8 65	7 59	7 01	6 63	6 37	6 18	6 03	5 91	5 81	5 52	5 36	5 26	5 20	5 12	5 12	4 96
9	10 56	8 02	6 99	6 42	6 06	5 80	5 61	5 47	5 35	5 26	4 96	4 81	4 71	4 65	4 57	4 57	4 41
10	10 04	7 56	6 55	5 99	5 64	5 39	5 20	5 06	4 94	4 85	4 56	4 41	4 31	4 25	4 17	4 17	4 01
11	9 65	7 21	6 22	5 67	5 32	5 07	4 89	4 74	4 63	4 54	4 25	4 10	4 01	3 94	3 86	3 86	3 71
12	9 33	6 93	5 95	5 41	5 06	4 82	4 64	4 50	4 39	4 30	4 01	3 86	3 76	3 70	3 62	3 62	3 47
13	9 07	6 70	5 74	5 21	4 86	4 62	4 44	4 30	4 19	4 10	3 82	3 67	3 57	3 51	3 43	3 43	3 27
14	8 86	6 52	5 56	5 04	4 70	4 46	4 28	4 14	4 03	3 94	3 66	3 51	3 41	3 35	3 27	3 27	3 11
15	8 68	6 36	5 42	4 89	4 56	4 32	4 14	4 00	3 90	3 81	3 52	3 37	3 28	3 21	3 13	3 13	2 98
16	8 53	6 23	5 29	4 77	4 44	4 20	4 03	3 89	3 78	3 69	3 41	3 26	3 16	3 10	3 02	3 02	2 86
17	8 40	6 11	5 19	4 67	4 34	4 10	3 93	3 79	3 68	3 59	3 31	3 16	3 07	3 00	2 92	2 92	2 76
18	8 29	6 01	5 09	4 58	4 25	4 02	3 84	3 71	3 60	3 51	3 23	3 08	2 98	2 92	2 84	2 84	2 68
19	8 19	5 93	5 01	4 50	4 17	3 94	3 77	3 63	3 52	3 43	3 15	3 00	2 91	2 84	2 76	2 76	2 60
20	8 10	5 85	4 94	4 43	4 10	3 87	3 70	3 56	3 46	3 37	3 09	2 94	2 84	2 78	2 70	2 69	2 54
21	8 02	5 78	4 87	4 37	4 04	3 81	3 64	3 51	3 40	3 31	3 03	2 88	2 79	2 72	2 64	2 64	2 48
22	7 95	5 72	4 82	4 31	3 99	3 76	3 59	3 45	3 35	3 26	2 98	2 83	2 73	2 67	2 58	2 58	2 42
23	7 88	5 66	4 77	4 26	3 94	3 71	3 54	3 41	3 30	3 21	2 93	2 78	2 69	2 62	2 54	2 54	2 37
24	7 82	5 61	4 72	4 22	3 90	3 67	3 50	3 36	3 26	3 17	2 89	2 74	2 64	2 58	2 49	2 49	2 33
25	7 77	5 57	4 68	4 18	3 86	3 63	3 46	3 32	3 22	3 13	2 85	2 70	2 60	2 54	2 45	2 45	2 29
26	7 72	5 53	4 64	4 14	3 82	3 59	3 42	3 29	3 18	3 09	2 82	2 66	2 57	2 50	2 42	2 42	2 25
27	7 68	5 49	4 60	4 11	3 79	3 56	3 39	3 26	3 15	3 06	2 78	2 63	2 54	2 47	2 38	2 38	2 22
28	7 64	5 45	4 57	4 07	3 75	3 53	3 36	3 23	3 12	3 03	2 75	2 60	2 51	2 44	2 35	2 35	2 19
29	7 60	5 42	4 54	4 05	3 73	3 50	3 33	3 20	3 09	3 01	2 73	2 57	2 48	2 41	2 33	2 33	2 16
30	7 56	5 39	4 51	4 02	3 70	3 47	3 30	3 17	3 07	2 98	2 70	2 55	2 45	2 39	2 30	2 30	2 13
35	7 42	5 27	4 40	3 91	3 59	3 37	3 20	3 07	2 96	2 88	2 60	2 44	2 35	2 28	2 19	2 19	2 02
40	7 31	5 18	4 31	3 83	3 51	3 29	3 12	2 99	2 89	2 80	2 52	2 37	2 27	2 20	2 11	2 11	1 94
45	7 23	5 11	4 25	3 77	3 45	3 23	3 07	2 94	2 83	2 74	2 46	2 31	2 21	2 14	2 05	2 05	1 88
50	7 17	5 06	4 20	3 72	3 41	3 19	3 02	2 89	2 78	2 70	2 42	2 27	2 17	2 10	2 01	2 01	1 82
60	7 08	4 98	4 13	3 65	3 34	3 12	2 95	2 82	2 72	2 63	2 35	2 20	2 10	2 03	1 94	1 94	1 75
70	7 01	4 92	4 07	3 60	3 29	3 07	2 91	2 78	2 67	2 59	2 31	2 15	2 05	1 98	1 89	1 83	1 70
80	6 96	4 88	4 04	3 56	3 26	3 04	2 87	2 74	2 64	2 55	2 27	2 12	2 01	1 94	1 85	1 79	1 65
90	6 93	4 85	4 01	3 53	3 23	3 01	2 84	2 72	2 61	2 52	2 24	2 09	1 99	1 92	1 82	1 76	1 62
100	6 90	4 82	3 98	3 51	3 21	2 99	2 82	2 69	2 59	2 50	2 22	2 07	1 97	1 89	1 80	1 74	1 60
200	6 76	4 71	3 88	3 41	3 11	2 89	2 73	2 60	2 50	2 41	2 13	1 97	1 87	1 79	1 69	1 63	1 48
300	6 72	4 68	3 85	3 38	3 08	2 86	2 70	2 57	2 47	2 38	2 10	1 94	1 84	1 76	1 66	1 59	1 44
400	6 70	4 66	3 83	3 37	3 06	2 85	2 68	2 56	2 45	2 37	2 08	1 92	1 82	1 75	1 64	1 58	1 42
500	6 69	4 65	3 82	3 36	3 05	2 84	2 68	2 55	2 44	2 36	2 70	1 92	1 81	1 74	1 63	1 57	1 41
10^3	6 66	4 63	3 80	3 34	3 04	2 82	2 66	2 53	2 43	2 34	2 06	1 90	1 79	1 72	1 61	1 54	1 38
10^5	6 64	4 61	3 78	3 32	3 02	2 80	2 64	2 51	2 41	2 32	2 04	1 88	1 77	1 70	1 59	1 53	1 36

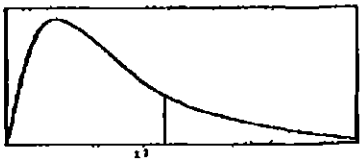


Table A1.7 Values of the χ^2 distribution for varying degrees of freedom (*df*) and α

	α										
	0.0005	0.001	0.005	0.01	0.025	0.05	0.1	0.15	0.2	0.25	0.3
1	12 1153	10.8274	7 8794	6 6349	5.0239	3 8415	2.7055	2 0722	1 6424	1.3233	1 0742
2	15 2014	13 8150	10 5965	9 2104	7 3778	5 9915	4 6052	3 7942	3.2189	2 7726	2 4079
3	17 7311	16 2660	12.8381	11 3449	9 3484	7 8147	6 2514	5 3170	4.6416	4 1083	3 6649
4	19 9977	18.4662	14.8602	13 2767	11 1433	9 4877	7.7794	6 7449	5 9886	5.3853	4 8784
5	22 1057	20.5147	16.7496	15 0863	12 8325	11 0705	9 2363	8 1152	7 2893	6 6257	6 0644
6	24 1016	22 4575	18 5475	16 8119	14.4494	12 5916	10 6446	9 4461	8 5581	7.8408	7 2311
7	26.0179	24 3213	20.2777	18 4753	16 0128	14 0671	12.0170	10 7479	9 8032	9 0371	8 3834
8	27 8674	26 1239	21.9549	20 0902	17 5345	15 5073	13 3616	12 0271	11.0301	10 2189	9.5245
9	29 6669	27 8767	23.5893	21 6660	19 0228	16 9190	14 6837	13 2880	12 2421	11 3887	10 6564
10	31 4195	29 5879	25.1881	23 2093	20.4832	18.3070	15 9872	14 5339	13 4420	12 5489	11 7807
11	33.1382	31 2635	26 7569	24 7250	21 9200	19 6752	17 2750	15 7671	14 6314	13.7007	12 8987
12	34.8211	32 9092	28.2997	26 2170	23 3367	21 0261	18 5493	16.9893	15 8120	14.8454	14.0111
13	36.4768	34 5274	29 8193	27 6882	24 7356	22 3620	19 8119	18 2020	16.9848	15 9839	15.1187
14	38 1085	36 1239	31.3194	29 1412	26 1189	23 6848	21 0641	19 4062	18 1508	17.1169	16.2221
15	39 7173	37 6978	32 8015	30.5780	27 4884	24 9958	22 3071	20.6030	19.3107	18 2451	17 3217
16	41.3077	39 2518	34 2671	31 9999	28 8453	26 2962	23 5418	21 7931	20 4651	19 3689	18 4179
17	42.8808	40 7911	35.7184	33 4087	30 1910	27 5871	24 7690	22 9770	21.6146	20 4887	19 5110
18	44 4337	42 3119	37 1564	34 8052	31 5264	28 8693	25 9894	24 1555	22 7595	21 6049	20 6014
19	45 9738	43 8194	38 5821	36 1908	32.8523	30 1435	27 2036	25 3289	23 9004	22 7178	21 6891
20	47 4977	45 3142	39 9969	37 5663	34 1696	31 4104	27 4120	26.4976	25 0375	23.8277	22 7745
21	49.0096	46 7963	41 4009	38 9322	35 4789	32 6706	29 6151	27.6620	26.1711	24 9348	23 8578
22	50 5105	48 2676	42.7957	40 2894	36 7807	33 9245	30 8133	28 8224	27 3015	26 0393	24 9390
23	51.9995	49 7276	44 1814	41.6383	38.0756	35.1725	32.0069	29.9792	24.4288	27 1413	26 0184
24	53 4776	51 1790	45 5584	42 9798	39 3641	36 4150	33 1962	31.1325	29 5533	28 2412	27 0960
25	54 9475	52 6187	49 9280	44 3140	40 6465	37 6525	34 3816	32.2825	30.6752	29.3388	28 1719
26	56.4068	54.0511	48.2898	45 6416	41 9231	38 8851	35.5632	33.4295	31 7946	30.4346	29.2463
27	57.8556	55.4751	49.6450	46.9628	43 1945	40 1133	36 7412	34 5736	32.9117	31 5284	30.3193
28	59.2990	56.8918	50.9936	48 2782	44 4608	41 3372	37.9159	35 7150	34 0266	32.6205	31 3909
29	60 7342	58 3006	52 3355	49 5878	45 7223	42 5569	39 0875	36 8538	35 1394	33 7109	32 4612
30	62.1600	59 1022	53 6719	50 8922	46.9792	43 7730	40 2560	37.9902	36 2502	34.7997	33.5302
31	63.5813	61 0980	55.0025	52 1914	48.2319	44 3853	41 4217	39 1244	37 3591	35 3373	34 5981
32	84.9935	62 4873	56 3280	53 4857	49.4804	48 1942	42.5847	40.2563	38 4663	35.3730	35 6649
33	66 4013	63 8694	57 6423	54 7754	50 7251	47 3999	43 7452	41 3861	39 5718	38 0575	36 7307
34	57 8042	65 2471	58.9637	56.0609	51 9660	48 6024	44 9032	42 5140	40 6756	39 1408	37 7954
35	99 1975	66 6192	60.2748	57 3420	53 2033	49 8018	48 0580	43 6399	41 7780	40.2228	38 8591
36	10 5882	67 3850	61.5811	58.6192	54.4373	50 9985	47 2122	44 7641	42 8788	41 3036	39 9220
37	71.9713	69 3476	62 9832	59 9926	55 6680	52 1923	48 3634	45 8864	43 9782	42 3833	40 9839
38	73 3580	70 7039	64 1812	61 1620	56 8955	53 2835	49.5126	47 0072	45.0763	43 4619	42 0450
39	74.7237	72 0550	65 4753	62 4281	58 1201	54 5722	50.6598	48 1263	46 1730	44.5395	43 1053
40	76 0953	73 4029	66 7660	63 6908	59 3417	55 7585	51 8050	49 2438	47 2685	45 6150	44 1649
45	82 0734	80 0776	73.1660	69.9569	65.4101	61 6562	57 5053	54 8105	52 7288	50 9849	49.4517
50	89 5597	86 6603	79.4898	75 1538	71 4202	57 5048	63 1671	60 3460	58.1638	56.3336	54 7228
55	96 1607	93 1671	85.7491	82 2920	77 3804	73 3115	68 7962	65 8550	53 5772	61 6650	59 9804
60	102 6971	99 6078	91 9518	88 3794	83.2977	79.0820	74 3970	71 3411	68 3721	66 9815	65 2265
100	153 1538	149 4488	140 1697	135 8069	129 5613	124 3421	118 4980	114.6538	111 6567	109 1412	105 9058
1000	1153 7344	1143 9196	1118 9475	1106 3690	1089 5307	1074 6794	1057 7240	1046.2849	1037 8381	1030.1157	1023 2140

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SECTION 1

Please answer the following 20 questions by ONLY giving the answer in ONE word or number. If necessary you can do calculations on the back of your answer sheet but not between the answers.

(1) The first step in the research process is the _____ of the problem

Use the data from the table below to answer questions 2 and 4

Employee	X	Y
A	6	9
B	7	8
C	7	9
N=3	$\sum X=20$	$\sum Y=26$

(2) What is $\sum X^2$?

(3) Calculate $\sum XY$.

(4) $\sum X \sum Y = ?$

(5) Module IOP2601 focuses mainly on drawing conclusions from analysed data True or false?

(6) A skewness of a distribution refers to the degree to which it deviates from symmetry True or false?

(7) On a histogram, which of the following always refers to the highest point on the distribution? Range or mode?

(8) A correlation of -1,07 shows a calculation error has been made. True or false?

Use the following data set to answer questions 9 to 12:
1, 7, 9, 9, 15, 33, 80, 110, 114

(9) What is the mode in the dataset?

(10) The range is _____.

(11) The median is 15,5 True or false?

(12) What is the mean?

(13) "Students registered for semester 1 perform better in the examinations than those registered for semester 2" This alternative hypothesis is an example of a one-tailed (directional) test True or false?

Use the data below to answer questions 14 to 15
The industrial and organisational psychology (IOP) department together with the human resources (HR) department have entered a crossword puzzle competition, to win R20 000 worth of prizes from a leading computer store, where they both qualified The IOP department sent 30 entries while the HR department sent 40 The competition administrators announced that a total of 400 entries qualified for the competition.

(14) What is the probability that the HR department will win the first prize?

(15) If the HR department wins first prize, what is the probability that the IOP department will win the second prize? (The first prize winning is not put back in the hopper)

(16) The standard deviation of a set of data can be a negative number True or false?

(17) The score distribution of an easy test in statistics will be skewed to the _____ Left or right?

(18) Would you reject the H_0 in the following instance? Yes or no?
the t-test statistic = -2,86 and the critical value = 2,262

(19) If you obtain a negative value for a variance, it means that the distribution is very negatively skewed True or false?

(20) Graphical displays are interpreted by means of a commentary on their symmetry, skewness, modality and kurtosis True or false?

TOTAL SECTION 1: [20]

SECTION 2

QUESTION 1 **[18]**

After calculating the correlation between the performance of students in Assignment 01 and their performance in Assignment 02, you found the following:

- The relationship between the performance of students in Assignment 01 and their performance in Assignment 02 was **0,91**
- The mean of *X* (Assignment 01) was **6** and the mean of *Y* (Assignment 02) was **7,44**
- The slope was **0,67**

Use the results above to respond to the following questions or instructions

(a) Interpret the correlation coefficient (2)

(b) What deduction can be made about the nature of the relationship? (1)

(c) Calculate the percentage of common variance between the two sets of scores and then illustrate this percentage diagrammatically (2)

From the above calculations, use the regression equation formula to predict the performance of a student in Assignment 02 based on his/her performance in Assignment 01

(d) What is the value of the intercept? (2)

(e) Calculate the examination score of a student who obtained a score of 2 in Assignment 01. (1)

(f) Provide a graphic representation of the regression line by indicating the intercept and predicted value for a student who obtained a score of 2 in Assignment 01 (5)

The distribution table below is for the scores of 150 students for the IOP2601 examinations. The minimum score obtained was 37 and the maximum score was 94 Use the frequency table below to do the following calculations:

Class interval	Frequency	Cumulative frequency	% Frequency	Cumulative % frequency
93–98	9	150	6	100
87–92	11	141	7 33	94,01
71–86	10	130	6,67	86,68
65–70	28	120	18,67	80,01
59–64	34	92	22,67	61,34
53–58	18	58	12	38,67
47–52	19	40	12,67	26,67
41–46	12	21	8	14
35–40	9	9	6	6

(g) What is the percentile rank for a score of 55? (3)

(h) What is the score of 75% of the students? In other words, what score is found at the 75 percentile? (2)

QUESTION 2 **[6]**

Given a normally distributed population with a mean (μ) of 9, a standard deviation (σ) of 3, and 400 as the number of cases (N), answer the following questions

(a) What is the **proportion** of students with a raw score greater than 5? (2)

(b) What is the **percentage** of students with a raw score lower than 15? (2)

(c) What is the **number** of students with raw scores between 5 and 15? (2)

QUESTION 3 **[10]**

The IOP2601 lecturers are interested to know if students' attitude towards statistics is different at the end of the course in comparison with their attitude towards statistics before the course They randomly select a group of 15 students from the class and present them with a questionnaire to assess their attitude towards statistics before they start with the course They again ask the same group of students to complete the questionnaire at the end of the course The following scores are obtained

Students' attitude towards statistics	
Before the course	**After the course**
9	10
9	11
6	9
8	6
7	7
5	12
7	9
8	11
6	14
7	15
9	5
5	7
7	6
4	8
8	9

They ask your help with the data analysis and request you to determine if there is a difference in students' attitude towards statistics after the course in comparison to their attitude before the course
You set the level of significance at $\alpha = 0,01$

(a) Formulate an appropriate null hypothesis (H_0) in symbols (1)

(b) Formulate an appropriate alternative hypothesis (H_1) in words (1)

(c) Assuming that your data are normally distributed, select an appropriate statistical test and calculate the test statistic Show ALL the calculations (3)

$\bar{D}$	s_D
-2,27	3,49

(d) Determine the degrees of freedom (1)

(e) Determine the critical value for a two-tailed test for a significance level of 1% (0,01) (1)

(f) Interpret the results in terms of the rejection or non-rejection of the null hypothesis (1)

(g) Interpret your rejection or non-rejection of the null hypothesis in plain language in terms of the original problem statement With how much certainty can you conclude this? (2)

QUESTION 4 **[12]**

The IOP2601 lecturers are interested to know if there are differences between students' attitude towards statistics for students at first-, second- and third-year level The following table represents the scores for attitudes towards statistics for each group

ATTITUDES TOWARDS STATISTICS		
1st year students (X_1)	**2nd year students (X_2)**	**3rd year students (X_3)**
6	7	9
6	7	9
3	5	8
5	6	7
2	8	9
4	5	6
3	6	8
$\Sigma X_1 = 29$	$\Sigma X_2 = 44$	$\Sigma X_3 = 56$
$\bar{X}_1 = 4,14$	$\bar{X}_2 = 6,29$	$\bar{X}_3 = 8$
Total	$\bar{X} = 6,14$ $\Sigma X = 129$ $\Sigma X^2 = 875$	

You would like to answer the following question Is there a significant difference in the attitudes towards statistics for students at first-, second- and third-year levels? Or, stated differently, you test the following null hypothesis

$$H_0 \ \mu_{1st\ year} = \mu_{2nd\ year} = \mu_{3rd\ year} \text{ with } \alpha = 0,05$$

(a) Choose an appropriate test statistic to test this hypothesis and calculate the test statistic Present your answers in a summary table (8)

(b) Determine the critical value that will help you to decide whether or not you should reject the null hypothesis at a **significance level of 0,05.** (1)

(c) Do you reject the null hypothesis? (1)

(d) Interpret your findings in terms of the original problem statement With how much certainty can you conclude this? (2)

QUESTION 5 **[4]**

You want to find out if there is a difference between historical first-year, second-year and third-year students regarding their level of satisfaction relating to the teaching method used for this module

In the table below, the responses of the various groups to the following question are captured

Are you satisfied with the way in which IOP2601 (organisational research methodology) was presented?

A) Yes
B) No

	A	B
First-year level	6	8
Second-year level	19	12
Third-year level	7	11

The chi-square value is 2,74.

(a) Determine the critical value **for a significance level of 0,01** (1)

(b) Do you reject the null hypothesis? (1)

(c) Interpret your findings in terms of the original problem statement With how much certainty can you come to this conclusion? (2)

TOTAL SECTION 2: [50]
GRAND TOTAL: [70]