EE3211 Final Exam Section A

Started: May 8 at 9:30am

Quiz Instructions

EE Student Guidelines for Online Examinations in Semester B 2020/21

In addition to the University set of Student Guidelines for Online Examination in Semester B, 2020/2021 (see attached), the Department would like to bring your attention to the following Departmental Student Guidelines:

- As announced by the University, a 2-device approach will be adopted for online examinations. **Both devices should have cameras and be connected via Zoom for real-time video monitoring.**They shall be arranged to capture a “face-to-face” angle and an approximate 105-degree view of hands and keyboard, as specified in the university guidelines. Virtual background is not allowed.
- For both devices, **login to Zoom via your Canvas account** for authentication purpose. (Zoom allows login with two devices using the same account.) Prepare also your Student ID card or other official ID with photo for identity verification.
- After connecting via Zoom, you should mute yourself, but keep the speakers on to avoid missing the announcements of invigilators. If you have any questions, ask the invigilators via Zoom private chat.
- Students are fully responsible for their examination environments including a quiet location and proper functioning and stable network connections of the two devices. If the video signal of either device is interrupted during an examination, **penalty will be imposed** by the Course Leader of the concerned course.
- Students are required to affirm the honesty pledge stated in the examination paper.
- Students are not allowed to sit next to or communicate with other people during the examination. They may be asked by invigilators to “sweep” their locations for a complete view of the surroundings.
- Students should remain connected in Zoom until the invigilators allow them to leave.
- Students taking examinations online must comply with the above guidelines and follow the instructions given by Course Leaders. Otherwise, invigilators will report the cases to the Departmental Discipline Committee for investigation.
- In general, Zoom login with camera monitoring is not required for students taking examinations on campus, but a laptop computer may be needed for completing some examinations.
- Should you have any technical problem during the exam, contact your course leader or invigilator via Zoom private chat or email immediately. Your course leader is your first contact point. However, if you are not able to contact them, you can reach the department via: Departmental hotline at (+852) 3442-7740; Department WhatsApp phone: 9269-4066; or Department WeChat.

Department WeChat ID

Question 1

0 pts

"I pledge that the answers in this exam are my own and that I will not seek or obtain an unfair advantage in producing these answers. Specifically,

- I will not plagiarize (copy without citation) from any source;
- I will not communicate or attempt to communicate with any other person during the exam/quiz; neither will I give or attempt, directly or indirectly, to give or get assistance to or from another student taking the exam/quiz; and
- I will use only approved devices (e.g., calculators) and/or approved device models. I understand that any act of academic dishonesty can lead to disciplinary action."

Please fill in your FULL NAME in the following blank.

Leung Chun Wau

TABLE 1 Exact binomial probabilities $Pr(X = k) = \binom{n}{k} p^k q^{n-k}$

n	k	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
2	0	.9025	.8100	.7225	.6400	.5625	.4900	.4225	.3600	.3025	.2500
	1	.0950	.1800	.2550	.3200	.3750	.4200	.4550	.4800	.4950	.5000
	2	.0025	.0100	.0225	.0400	.0625	.0900	.1225	.1600	.2025	.2500
3	0	.8574	.7290	.6141	.5120	.4219	.3430	.2746	.2160	.1664	.1250
	1	.1354	.2430	.3251	.3840	.4219	.4410	.4436	.4320	.4084	.3750
	2	.0071	.0270	.0574	.0960	.1406	.1890	.2389	.2880	.3341	.3750
	3	.0001	.0010	.0034	.0080	.0156	.0270	.0429	.0640	.0911	.1250
4	0	.8145	.6561	.5220	.4096	.3164	.2401	.1785	.1296	.0915	.0625
	1	.1715	.2916	.3685	.4096	.4219	.4116	.3845	.3456	.2995	.2500
	2	.0135	.0486	.0975	.1536	.2109	.2646	.3105	.3456	.3675	.3750
	3	.0005	.0036	.0115	.0256	.0469	.0756	.1115	.1536	.2005	.2500
	4	.0000	.0001	.0005	.0016	.0039	.0081	.0150	.0256	.0410	.0625
5	0	.7738	.5905	.4437	.3277	.2373	.1681	.1160	.0778	.0503	.0313
	1	.2036	.3280	.3915	.4096	.3955	.3602	.3124	.2592	.2059	.1563
	2	.0214	.0729	.1382	.2048	.2637	.3087	.3364	.3456	.3369	.3125
	3	.0011	.0081	.0244	.0512	.0879	.1323	.1811	.2304	.2757	.3125
	4	.0000	.0004	.0022	.0064	.0146	.0283	.0488	.0768	.1128	.1563
	5	.0000	.0000	.0001	.0003	.0010	.0024	.0053	.0102	.0185	.0313
6	0	.7351	.5314	.3771	.2621	.1780	.1176	.0754	.0467	.0277	.0156
	1	.2321	.3543	.3993	.3932	.3560	.3025	.2437	.1866	.1359	.0938
	2	.0305	.0984	.1762	.2458	.2966	.3241	.3280	.3110	.2780	.2344
	3	.0021	.0146	.0415	.0819	.1318	.1852	.2355	.2765	.3032	.3125
	4	.0001	.0012	.0055	.0154	.0330	.0595	.0951	.1382	.1861	.2344
	5	.0000	.0001	.0004	.0015	.0044	.0102	.0205	.0369	.0609	.0938
	6	.0000	.0000	.0000	.0001	.0002	.0007	.0018	.0041	.0083	.0156
7	0	.6983	.4783	.3206	.2097	.1335	.0824	.0490	.0280	.0152	.0078
	1	.2573	.3720	.3960	.3670	.3115	.2471	.1848	.1306	.0872	.0547
	2	.0406	.1240	.2097	.2753	.3115	.3177	.2985	.2613	.2140	.1641
	3	.0036	.0230	.0617	.1147	.1730	.2269	.2679	.2903	.2918	.2734
	4	.0002	.0026	.0109	.0287	.0577	.0972	.1442	.1935	.2388	.2734
	5	.0000	.0002	.0012	.0043	.0115	.0250	.0466	.0774	.1172	.1641
	6	.0000	.0000	.0001	.0004	.0013	.0036	.0084	.0172	.0320	.0547
	7	.0000	.0000	.0000	.0000	.0001	.0002	.0006	.0016	.0037	.0078
8	0	.6634	.4305	.2725	.1678	.1001	.0576	.0319	.0168	.0084	.0039
	1	.2793	.3826	.3847	.3355	.2670	.1977	.1373	.0896	.0548	.0313
	2	.0515	.1488	.2376	.2936	.3115	.2965	.2587	.2090	.1569	.1094
	3	.0054	.0331	.0839	.1468	.2076	.2541	.2786	.2787	.2568	.2188

(continued on next page)

TABLE 1 Exact binomial probabilities $Pr(X = k) = \binom{n}{k} p^k q^{n-k}$ *(continued)*

n	k	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
	4	.0004	.0046	.0185	.0459	.0865	.1361	.1875	.2322	.2627	.2734
	5	.0000	.0004	.0026	.0092	.0231	.0467	.0808	.1239	.1719	.2188
	6	.0000	.0000	.0002	.0011	.0038	.0100	.0217	.0413	.0703	.1094
	7	.0000	.0000	.0000	.0001	.0004	.0012	.0033	.0079	.0164	.0313
	8	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0007	.0017	.0039
9	0	.6302	.3874	.2316	.1342	.0751	.0404	.0207	.0101	.0046	.0020
	1	.2985	.3874	.3679	.3020	.2253	.1556	.1004	.0605	.0339	.0176
	2	.0629	.1722	.2597	.3020	.3003	.2668	.2162	.1612	.1110	.0703
	3	.0077	.0446	.1069	.1762	.2336	.2668	.2716	.2508	.2119	.1641
	4	.0006	.0074	.0283	.0661	.1168	.1715	.2194	.2508	.2600	.2461
	5	.0000	.0008	.0050	.0165	.0389	.0735	.1181	.1672	.2128	.2461
	6	.0000	.0001	.0006	.0028	.0087	.0210	.0424	.0743	.1160	.1641
	7	.0000	.0000	.0000	.0003	.0012	.0039	.0098	.0212	.0407	.0703
	8	.0000	.0000	.0000	.0000	.0001	.0004	.0013	.0035	.0083	.0176
	9	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0008	.0020
10	0	.5987	.3487	.1969	.1074	.0563	.0282	.0135	.0060	.0025	.0010
	1	.3151	.3874	.3474	.2684	.1877	.1211	.0725	.0403	.0207	.0098
	2	.0746	.1937	.2759	.3020	.2816	.2335	.1757	.1209	.0763	.0439
	3	.0105	.0574	.1298	.2013	.2503	.2668	.2522	.2150	.1665	.1172
	4	.0010	.0112	.0401	.0881	.1460	.2001	.2377	.2508	.2384	.2051
	5	.0001	.0015	.0085	.0264	.0584	.1029	.1536	.2007	.2340	.2461
	6	.0000	.0001	.0012	.0055	.0162	.0368	.0689	.1115	.1596	.2051
	7	.0000	.0000	.0001	.0008	.0031	.0090	.0212	.0425	.0746	.1172
	8	.0000	.0000	.0000	.0001	.0004	.0014	.0043	.0106	.0229	.0439
	9	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0016	.0042	.0098
	10	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010
11	0	.5688	.3138	.1673	.0859	.0422	.0198	.0088	.0036	.0014	.0005
	1	.3293	.3835	.3248	.2362	.1549	.0932	.0518	.0266	.0125	.0054
	2	.0867	.2131	.2866	.2953	.2581	.1998	.1395	.0887	.0513	.0269
	3	.0137	.0710	.1517	.2215	.2581	.2568	.2254	.1774	.1259	.0806
	4	.0014	.0158	.0536	.1107	.1721	.2201	.2428	.2365	.2060	.1611
	5	.0001	.0025	.0132	.0388	.0803	.1321	.1830	.2207	.2360	.2256
	6	.0000	.0003	.0023	.0097	.0268	.0566	.0985	.1471	.1931	.2256
	7	.0000	.0000	.0003	.0017	.0064	.0173	.0379	.0701	.1128	.1611
	8	.0000	.0000	.0000	.0002	.0011	.0037	.0102	.0234	.0462	.0806
	9	.0000	.0000	.0000	.0000	.0001	.0005	.0018	.0052	.0126	.0269
	10	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0007	.0021	.0054
	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0005
12	0	.5404	.2824	.1422	.0687	.0317	.0138	.0057	.0022	.0008	.0002
	1	.3413	.3766	.3012	.2062	.1267	.0712	.0368	.0174	.0075	.0029
	2	.0988	.2301	.2924	.2835	.2323	.1678	.1088	.0639	.0339	.0161
	3	.0173	.0852	.1720	.2362	.2581	.2397	.1954	.1419	.0923	.0537

	4	.0021	.0213	.0683	.1329	.1936	.2311	.2367	.2128	.1700	.1208
	5	.0002	.0038	.0193	.0532	.1032	.1585	.2039	.2270	.2225	.1934
	6	.0000	.0005	.0040	.0155	.0401	.0792	.1281	.1766	.2124	.2256
	7	.0000	.0000	.0006	.0033	.0115	.0291	.0591	.1009	.1489	.1934
	8	.0000	.0000	.0001	.0005	.0024	.0078	.0199	.0420	.0762	.1208
	9	.0000	.0000	.0000	.0001	.0004	.0015	.0048	.0125	.0277	.0537
	10	.0000	.0000	.0000	.0000	.0000	.0002	.0008	.0025	.0068	.0161
	11	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	.0029
	12	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002
13	0	.5133	.2542	.1209	.0550	.0238	.0097	.0037	.0013	.0004	.0001
	1	.3512	.3672	.2774	.1787	.1029	.0540	.0259	.0113	.0045	.0016
	2	.1109	.2448	.2937	.2680	.2059	.1388	.0836	.0453	.0220	.0095
	3	.0214	.0997	.1900	.2457	.2517	.2181	.1651	.1107	.0660	.0349
	4	.0028	.0277	.0838	.1535	.2097	.2337	.2222	.1845	.1350	.0873
	5	.0003	.0055	.0266	.0691	.1258	.1803	.2154	.2214	.1989	.1571

(continued on next page)

TABLE 1 Exact binomial probabilities $Pr(X = k) = \binom{n}{k} p^k q^{n-k}$ *(continued)*

n	k	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
	6	.0000	.0008	.0063	.0230	.0559	.1030	.1546	.1968	.2169	.2095
	7	.0000	.0001	.0011	.0058	.0186	.0442	.0833	.1312	.1775	.2095
	8	.0000	.0000	.0001	.0011	.0047	.0142	.0336	.0656	.1089	.1571
	9	.0000	.0000	.0000	.0001	.0009	.0034	.0101	.0243	.0495	.0873
	10	.0000	.0000	.0000	.0000	.0001	.0006	.0022	.0065	.0162	.0349
	11	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0012	.0036	.0095
	12	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0016
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
14	0	.4877	.2288	.1028	.0440	.0178	.0068	.0024	.0008	.0002	.0001
	1	.3593	.3559	.2539	.1539	.0832	.0407	.0181	.0073	.0027	.0009
	2	.1229	.2570	.2912	.2501	.1802	.1134	.0634	.0317	.0141	.0056
	3	.0259	.1142	.2056	.2501	.2402	.1943	.1366	.0845	.0462	.0222
	4	.0037	.0349	.0998	.1720	.2202	.2290	.2022	.1549	.1040	.0611
	5	.0004	.0078	.0352	.0860	.1468	.1963	.2178	.2066	.1701	.1222
	6	.0000	.0013	.0093	.0322	.0734	.1262	.1759	.2066	.2088	.1833
	7	.0000	.0002	.0019	.0092	.0280	.0618	.1082	.1574	.1952	.2095
	8	.0000	.0000	.0003	.0020	.0082	.0232	.0510	.0918	.1398	.1833
	9	.0000	.0000	.0000	.0003	.0018	.0066	.0183	.0408	.0762	.1222
	10	.0000	.0000	.0000	.0000	.0003	.0014	.0049	.0136	.0312	.0611
	11	.0000	.0000	.0000	.0000	.0000	.0002	.0010	.0033	.0093	.0222
	12	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0019	.0056
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0009
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
15	0	.4633	.2059	.0874	.0352	.0134	.0047	.0016	.0005	.0001	.0000
	1	.3658	.3432	.2312	.1319	.0668	.0305	.0126	.0047	.0016	.0005
	2	.1348	.2669	.2856	.2309	.1559	.0916	.0476	.0219	.0090	.0032
	3	.0307	.1285	.2184	.2501	.2252	.1700	.1110	.0634	.0318	.0139
	4	.0049	.0428	.1156	.1876	.2252	.2186	.1792	.1268	.0780	.0417
	5	.0006	.0105	.0449	.1032	.1651	.2061	.2123	.1859	.1404	.0916
	6	.0000	.0019	.0132	.0430	.0917	.1472	.1906	.2066	.1914	.1527
	7	.0000	.0003	.0030	.0138	.0393	.0811	.1319	.1771	.2013	.1964
	8	.0000	.0000	.0005	.0035	.0131	.0348	.0710	.1181	.1647	.1964
	9	.0000	.0000	.0001	.0007	.0034	.0116	.0298	.0612	.1048	.1527
	10	.0000	.0000	.0000	.0001	.0007	.0030	.0096	.0245	.0515	.0916
	11	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0074	.0191	.0417
	12	.0000	.0000	.0000	.0000	.0000	.0001	.0004	.0016	.0052	.0139
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	.0032
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
16	0	.4401	.1853	.0743	.0281	.0100	.0033	.0010	.0003	.0001	.0000
	1	.3706	.3294	.2097	.1126	.0535	.0228	.0087	.0030	.0009	.0002
	2	.1463	.2745	.2775	.2111	.1336	.0732	.0353	.0150	.0056	.0018
	3	.0359	.1423	.2285	.2463	.2079	.1465	.0888	.0468	.0215	.0085
	4	.0061	.0514	.1311	.2001	.2252	.2040	.1553	.1014	.0572	.0278
	5	.0008	.0137	.0555	.1201	.1802	.2099	.2008	.1623	.1123	.0667
	6	.0001	.0028	.0180	.0550	.1101	.1649	.1982	.1983	.1684	.1222
	7	.0000	.0004	.0045	.0197	.0524	.1010	.1524	.1889	.1969	.1746
	8	.0000	.0001	.0009	.0055	.0197	.0487	.0923	.1417	.1812	.1964
	9	.0000	.0000	.0001	.0012	.0058	.0185	.0442	.0840	.1318	.1746
	10	.0000	.0000	.0000	.0002	.0014	.0056	.0167	.0392	.0755	.1222
	11	.0000	.0000	.0000	.0000	.0002	.0013	.0049	.0142	.0337	.0667
	12	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0040	.0115	.0278
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0008	.0029	.0085
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

(continued on next page)

TABLE 1 Exact binomial probabilities $Pr(X = k) = \binom{n}{k} p^k q^{n-k}$ *(continued)*

n	k	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
17	0	.4181	.1668	.0631	.0225	.0075	.0023	.0007	.0002	.0000	.0000
	1	.3741	.3150	.1893	.0957	.0426	.0169	.0060	.0019	.0005	.0001
	2	.1575	.2800	.2673	.1914	.1136	.0581	.0260	.0102	.0035	.0010
	3	.0415	.1556	.2359	.2393	.1893	.1245	.0701	.0341	.0144	.0052
	4	.0076	.0605	.1457	.2093	.2209	.1868	.1320	.0796	.0411	.0182
	5	.0010	.0175	.0668	.1361	.1914	.2081	.1849	.1379	.0875	.0472
	6	.0001	.0039	.0236	.0680	.1276	.1784	.1991	.1839	.1432	.0944
	7	.0000	.0007	.0065	.0267	.0668	.1201	.1685	.1927	.1841	.1484
	8	.0000	.0001	.0014	.0084	.0279	.0644	.1134	.1606	.1883	.1855
	9	.0000	.0000	.0003	.0021	.0093	.0276	.0611	.1070	.1540	.1855
	10	.0000	.0000	.0000	.0004	.0025	.0095	.0263	.0571	.1008	.1484
	11	.0000	.0000	.0000	.0001	.0005	.0026	.0090	.0242	.0525	.0944
	12	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0081	.0215	.0472
	13	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0021	.0068	.0182
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0004	.0016	.0052
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
	17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
18	0	.3972	.1501	.0536	.0180	.0056	.0016	.0004	.0001	.0000	.0000
	1	.3763	.3002	.1704	.0811	.0338	.0126	.0042	.0012	.0003	.0001
	2	.1683	.2835	.2556	.1723	.0958	.0458	.0190	.0069	.0022	.0006
	3	.0473	.1680	.2406	.2297	.1704	.1046	.0547	.0246	.0095	.0031
	4	.0093	.0700	.1592	.2153	.2130	.1681	.1104	.0614	.0291	.0117
	5	.0014	.0218	.0787	.1507	.1988	.2017	.1664	.1146	.0666	.0327
	6	.0002	.0052	.0301	.0816	.1436	.1873	.1941	.1655	.1181	.0708
	7	.0000	.0010	.0091	.0350	.0820	.1376	.1792	.1892	.1657	.1214
	8	.0000	.0002	.0022	.0120	.0376	.0811	.1327	.1734	.1864	.1669
	9	.0000	.0000	.0004	.0033	.0139	.0386	.0794	.1284	.1694	.1855

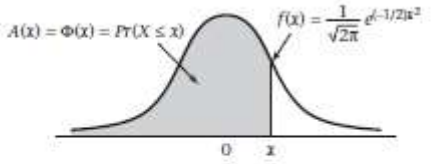
10	.0000	.0000	.0001	.0008	.0042	.0149	.0385	.0771	.1248	.1669
11	.0000	.0000	.0000	.0001	.0010	.0046	.0151	.0374	.0742	.1214
12	.0000	.0000	.0000	.0000	.0002	.0012	.0047	.0145	.0354	.0708
13	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0045	.0134	.0327
14	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0039	.0117
15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0009	.0031
16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006
17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
19 0	.3774	.1351	.0456	.0144	.0042	.0011	.0003	.0001	.0000	.0000
1	.3774	.2852	.1529	.0685	.0268	.0093	.0029	.0008	.0002	.0000
2	.1787	.2852	.2428	.1540	.0803	.0358	.0138	.0046	.0013	.0003
3	.0533	.1796	.2428	.2182	.1517	.0869	.0422	.0175	.0062	.0018
4	.0112	.0798	.1714	.2182	.2023	.1491	.0909	.0467	.0203	.0074
5	.0018	.0266	.0907	.1636	.2023	.1916	.1468	.0933	.0497	.0222
6	.0002	.0069	.0374	.0955	.1574	.1916	.1844	.1451	.0949	.0518
7	.0000	.0014	.0122	.0443	.0974	.1525	.1844	.1797	.1443	.0961
8	.0000	.0002	.0032	.0166	.0487	.0981	.1489	.1797	.1771	.1442
9	.0000	.0000	.0007	.0051	.0198	.0514	.0980	.1464	.1771	.1762
10	.0000	.0000	.0001	.0013	.0066	.0220	.0528	.0976	.1449	.1762
11	.0000	.0000	.0000	.0003	.0018	.0077	.0233	.0532	.0970	.1442
12	.0000	.0000	.0000	.0000	.0004	.0022	.0083	.0237	.0529	.0961
13	.0000	.0000	.0000	.0000	.0001	.0005	.0024	.0085	.0233	.0518
14	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0082	.0222
15	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0022	.0074
16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018
17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003

(continued on next page)

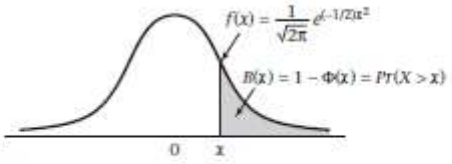
TABLE 1 Exact binomial probabilities $Pr(X = k) = \binom{n}{k} p^k q^{n-k}$ *(continued)*

n	k	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
	18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	19	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
20	0	.3585	.1216	.0388	.0115	.0032	.0008	.0002	.0000	.0000	.0000
	1	.3774	.2702	.1368	.0576	.0211	.0068	.0020	.0005	.0001	.0000
	2	.1887	.2852	.2293	.1369	.0669	.0278	.0100	.0031	.0008	.0002
	3	.0596	.1901	.2428	.2054	.1339	.0716	.0323	.0123	.0040	.0011
	4	.0133	.0898	.1821	.2182	.1897	.1304	.0738	.0350	.0139	.0046
	5	.0022	.0319	.1028	.1746	.2023	.1789	.1272	.0746	.0365	.0148
	6	.0003	.0089	.0454	.1091	.1686	.1916	.1712	.1244	.0746	.0370
	7	.0000	.0020	.0160	.0546	.1124	.1643	.1844	.1659	.1221	.0739
	8	.0000	.0004	.0046	.0222	.0609	.1144	.1614	.1797	.1623	.1201
	9	.0000	.0001	.0011	.0074	.0271	.0654	.1158	.1597	.1771	.1602
	10	.0000	.0000	.0002	.0020	.0099	.0308	.0686	.1171	.1593	.1762
	11	.0000	.0000	.0000	.0005	.0030	.0120	.0336	.0710	.1185	.1602
	12	.0000	.0000	.0000	.0001	.0008	.0039	.0136	.0355	.0727	.1201
	13	.0000	.0000	.0000	.0000	.0002	.0010	.0045	.0146	.0366	.0739
	14	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0049	.0150	.0370
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0013	.0049	.0148
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0013	.0046
	17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011
	18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002
	19	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	20	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

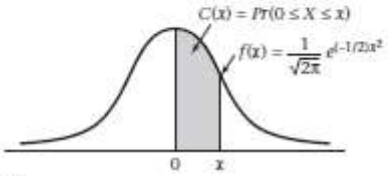
TABLE 3 The normal distribution



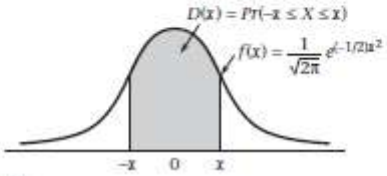
(a)



(b)



(c)



(d)

x	A[a]	B[b]	C[c]	D[d]	x	A	B	C	D
0.0	.5000	.5000	.0	.0	0.32	.6255	.3745	.1255	.2510
0.01	.5040	.4960	.0040	.0080	0.33	.6293	.3707	.1293	.2586
0.02	.5080	.4920	.0080	.0160	0.34	.6331	.3669	.1331	.2661
0.03	.5120	.4880	.0120	.0239	0.35	.6368	.3632	.1368	.2737
0.04	.5160	.4840	.0160	.0319	0.36	.6406	.3594	.1406	.2812
0.05	.5199	.4801	.0199	.0399	0.37	.6443	.3557	.1443	.2886
0.06	.5239	.4761	.0239	.0478	0.38	.6480	.3520	.1480	.2961
0.07	.5279	.4721	.0279	.0558	0.39	.6517	.3483	.1517	.3035
0.08	.5319	.4681	.0319	.0638	0.40	.6554	.3446	.1554	.3108
0.09	.5359	.4641	.0359	.0717	0.41	.6591	.3409	.1591	.3182
0.10	.5398	.4602	.0398	.0797	0.42	.6628	.3372	.1628	.3255
0.11	.5438	.4562	.0438	.0876	0.43	.6664	.3336	.1664	.3328
0.12	.5478	.4522	.0478	.0955	0.44	.6700	.3300	.1700	.3401
0.13	.5517	.4483	.0517	.1034	0.45	.6736	.3264	.1736	.3473
0.14	.5557	.4443	.0557	.1113	0.46	.6772	.3228	.1772	.3545
0.15	.5596	.4404	.0596	.1192	0.47	.6808	.3192	.1808	.3616
0.16	.5636	.4364	.0636	.1271	0.48	.6844	.3156	.1844	.3688
0.17	.5675	.4325	.0675	.1350	0.49	.6879	.3121	.1879	.3759
0.18	.5714	.4286	.0714	.1428	0.50	.6915	.3085	.1915	.3829
0.19	.5753	.4247	.0753	.1507	0.51	.6950	.3050	.1950	.3899
0.20	.5793	.4207	.0793	.1585	0.52	.6985	.3015	.1985	.3969
0.21	.5832	.4168	.0832	.1663	0.53	.7019	.2981	.2019	.4039
0.22	.5871	.4129	.0871	.1741	0.54	.7054	.2946	.2054	.4108
0.23	.5910	.4090	.0910	.1819	0.55	.7088	.2912	.2088	.4177
0.24	.5948	.4052	.0948	.1897	0.56	.7123	.2877	.2123	.4245
0.25	.5987	.4013	.0987	.1974	0.57	.7157	.2843	.2157	.4313
0.26	.6026	.3974	.1026	.2051	0.58	.7190	.2810	.2190	.4381
0.27	.6064	.3936	.1064	.2128	0.59	.7224	.2776	.2224	.4448
0.28	.6103	.3897	.1103	.2205	0.60	.7257	.2743	.2257	.4515
0.29	.6141	.3859	.1141	.2282	0.61	.7291	.2709	.2291	.4581
0.30	.6179	.3821	.1179	.2358	0.62	.7324	.2676	.2324	.4647
0.31	.6217	.3783	.1217	.2434	0.63	.7357	.2643	.2357	.4713

(continued on next page)

TABLE 3 The normal distribution *(continued)*

x	A^a	B^b	C^c	D^d	x	A	B	C	D
0.64	.7389	.2611	.2389	.4778	1.23	.8907	.1093	.3907	.7813
0.65	.7422	.2578	.2422	.4843	1.24	.8925	.1075	.3925	.7850
0.66	.7454	.2546	.2454	.4907	1.25	.8944	.1056	.3944	.7887
0.67	.7486	.2514	.2486	.4971	1.26	.8962	.1038	.3962	.7923
0.68	.7517	.2483	.2517	.5035	1.27	.8980	.1020	.3980	.7959
0.69	.7549	.2451	.2549	.5098	1.28	.8997	.1003	.3997	.7995
0.70	.7580	.2420	.2580	.5161	1.29	.9015	.0985	.4015	.8029
0.71	.7611	.2389	.2611	.5223	1.30	.9032	.0968	.4032	.8064
0.72	.7642	.2358	.2642	.5285	1.31	.9049	.0951	.4049	.8098
0.73	.7673	.2327	.2673	.5346	1.32	.9066	.0934	.4066	.8132
0.74	.7703	.2297	.2703	.5407	1.33	.9082	.0918	.4082	.8165
0.75	.7734	.2266	.2734	.5467	1.34	.9099	.0901	.4099	.8198
0.76	.7764	.2236	.2764	.5527	1.35	.9115	.0885	.4115	.8230
0.77	.7793	.2207	.2793	.5587	1.36	.9131	.0869	.4131	.8262
0.78	.7823	.2177	.2823	.5646	1.37	.9147	.0853	.4147	.8293
0.79	.7852	.2148	.2852	.5705	1.38	.9162	.0838	.4162	.8324
0.80	.7881	.2119	.2881	.5763	1.39	.9177	.0823	.4177	.8355
0.81	.7910	.2090	.2910	.5821	1.40	.9192	.0808	.4192	.8385
0.82	.7939	.2061	.2939	.5878	1.41	.9207	.0793	.4207	.8415
0.83	.7967	.2033	.2967	.5935	1.42	.9222	.0778	.4222	.8444
0.84	.7995	.2005	.2995	.5991	1.43	.9236	.0764	.4236	.8473
0.85	.8023	.1977	.3023	.6047	1.44	.9251	.0749	.4251	.8501
0.86	.8051	.1949	.3051	.6102	1.45	.9265	.0735	.4265	.8529
0.87	.8078	.1922	.3078	.6157	1.46	.9279	.0721	.4279	.8557
0.88	.8106	.1894	.3106	.6211	1.47	.9292	.0708	.4292	.8584
0.89	.8133	.1867	.3133	.6265	1.48	.9306	.0694	.4306	.8611
0.90	.8159	.1841	.3159	.6319	1.49	.9319	.0681	.4319	.8638
0.91	.8186	.1814	.3186	.6372	1.50	.9332	.0668	.4332	.8664
0.92	.8212	.1788	.3212	.6424	1.51	.9345	.0655	.4345	.8690
0.93	.8238	.1762	.3238	.6476	1.52	.9357	.0643	.4357	.8715
0.94	.8264	.1736	.3264	.6528	1.53	.9370	.0630	.4370	.8740
0.95	.8289	.1711	.3289	.6579	1.54	.9382	.0618	.4382	.8764
0.96	.8315	.1685	.3315	.6629	1.55	.9394	.0606	.4394	.8789
0.97	.8340	.1660	.3340	.6680	1.56	.9406	.0594	.4406	.8812
0.98	.8365	.1635	.3365	.6729	1.57	.9418	.0582	.4418	.8836
0.99	.8389	.1611	.3389	.6778	1.58	.9429	.0571	.4429	.8859
1.00	.8413	.1587	.3413	.6827	1.59	.9441	.0559	.4441	.8882
1.01	.8438	.1562	.3438	.6875	1.60	.9452	.0548	.4452	.8904
1.02	.8461	.1539	.3461	.6923	1.61	.9463	.0537	.4463	.8926
1.03	.8485	.1515	.3485	.6970	1.62	.9474	.0526	.4474	.8948
1.04	.8508	.1492	.3508	.7017	1.63	.9484	.0516	.4484	.8969
1.05	.8531	.1469	.3531	.7063	1.64	.9495	.0505	.4495	.8990
1.06	.8554	.1446	.3554	.7109	1.65	.9505	.0495	.4505	.9011
1.07	.8577	.1423	.3577	.7154	1.66	.9515	.0485	.4515	.9031
1.08	.8599	.1401	.3599	.7199	1.67	.9525	.0475	.4525	.9051
1.09	.8621	.1379	.3621	.7243	1.68	.9535	.0465	.4535	.9070
1.10	.8643	.1357	.3643	.7287	1.69	.9545	.0455	.4545	.9090
1.11	.8665	.1335	.3665	.7330	1.70	.9554	.0446	.4554	.9109
1.12	.8686	.1314	.3686	.7373	1.71	.9564	.0436	.4564	.9127
1.13	.8708	.1292	.3708	.7415	1.72	.9573	.0427	.4573	.9146
1.14	.8729	.1271	.3729	.7457	1.73	.9582	.0418	.4582	.9164
1.15	.8749	.1251	.3749	.7499	1.74	.9591	.0409	.4591	.9181
1.16	.8770	.1230	.3770	.7540	1.75	.9599	.0401	.4599	.9199
1.17	.8790	.1210	.3790	.7580	1.76	.9608	.0392	.4608	.9216
1.18	.8810	.1190	.3810	.7620	1.77	.9616	.0384	.4616	.9233
1.19	.8830	.1170	.3830	.7660	1.78	.9625	.0375	.4625	.9249
1.20	.8849	.1151	.3849	.7699	1.79	.9633	.0367	.4633	.9265
1.21	.8869	.1131	.3869	.7737	1.80	.9641	.0359	.4641	.9281
1.22	.8888	.1112	.3888	.7775	1.81	.9649	.0351	.4649	.9297

TABLE 3 The normal distribution *(continued)*

x	A^a	B^b	C^c	D^d	x	A	B	C	D
1.82	.9656	.0344	.4656	.9312	2.39	.9916	.0084	.4916	.9832
1.83	.9664	.0336	.4664	.9327	2.40	.9918	.0082	.4918	.9836
1.84	.9671	.0329	.4671	.9342	2.41	.9920	.0080	.4920	.9840
1.85	.9678	.0322	.4678	.9357	2.42	.9922	.0078	.4922	.9845
1.86	.9686	.0314	.4686	.9371	2.43	.9925	.0075	.4925	.9849
1.87	.9693	.0307	.4693	.9385	2.44	.9927	.0073	.4927	.9853
1.88	.9699	.0301	.4699	.9399	2.45	.9929	.0071	.4929	.9857
1.89	.9706	.0294	.4706	.9412	2.46	.9931	.0069	.4931	.9861
1.90	.9713	.0287	.4713	.9426	2.47	.9932	.0068	.4932	.9865
1.91	.9719	.0281	.4719	.9439	2.48	.9934	.0066	.4934	.9869
1.92	.9726	.0274	.4726	.9451	2.49	.9936	.0064	.4936	.9872
1.93	.9732	.0268	.4732	.9464	2.50	.9938	.0062	.4938	.9876
1.94	.9738	.0262	.4738	.9476	2.51	.9940	.0060	.4940	.9879
1.95	.9744	.0256	.4744	.9488	2.52	.9941	.0059	.4941	.9883
1.96	.9750	.0250	.4750	.9500	2.53	.9943	.0057	.4943	.9886
1.97	.9756	.0244	.4756	.9512	2.54	.9945	.0055	.4945	.9889
1.98	.9761	.0239	.4761	.9523	2.55	.9946	.0054	.4946	.9892
1.99	.9767	.0233	.4767	.9534	2.56	.9948	.0052	.4948	.9895
2.00	.9772	.0228	.4772	.9545	2.57	.9949	.0051	.4949	.9898
2.01	.9778	.0222	.4778	.9556	2.58	.9951	.0049	.4951	.9901
2.02	.9783	.0217	.4783	.9566	2.59	.9952	.0048	.4952	.9904
2.03	.9788	.0212	.4788	.9576	2.60	.9953	.0047	.4953	.9907
2.04	.9793	.0207	.4793	.9586	2.61	.9955	.0045	.4955	.9909
2.05	.9798	.0202	.4798	.9596	2.62	.9956	.0044	.4956	.9912
2.06	.9803	.0197	.4803	.9606	2.63	.9957	.0043	.4957	.9915
2.07	.9808	.0192	.4808	.9615	2.64	.9959	.0041	.4959	.9917
2.08	.9812	.0188	.4812	.9625	2.65	.9960	.0040	.4960	.9920
2.09	.9817	.0183	.4817	.9634	2.66	.9961	.0039	.4961	.9922
2.10	.9821	.0179	.4821	.9643	2.67	.9962	.0038	.4962	.9924
2.11	.9826	.0174	.4826	.9651	2.68	.9963	.0037	.4963	.9926
2.12	.9830	.0170	.4830	.9660	2.69	.9964	.0036	.4964	.9929
2.13	.9834	.0166	.4834	.9668	2.70	.9965	.0035	.4965	.9931
2.14	.9838	.0162	.4838	.9676	2.71	.9966	.0034	.4966	.9933
2.15	.9842	.0158	.4842	.9684	2.72	.9967	.0033	.4967	.9935
2.16	.9846	.0154	.4846	.9692	2.73	.9968	.0032	.4968	.9937
2.17	.9850	.0150	.4850	.9700	2.74	.9969	.0031	.4969	.9939
2.18	.9854	.0146	.4854	.9707	2.75	.9970	.0030	.4970	.9940
2.19	.9857	.0143	.4857	.9715	2.76	.9971	.0029	.4971	.9942
2.20	.9861	.0139	.4861	.9722	2.77	.9972	.0028	.4972	.9944
2.21	.9864	.0136	.4864	.9729	2.78	.9973	.0027	.4973	.9946
2.22	.9868	.0132	.4868	.9736	2.79	.9974	.0026	.4974	.9947
2.23	.9871	.0129	.4871	.9743	2.80	.9974	.0026	.4974	.9949
2.24	.9875	.0125	.4875	.9749	2.81	.9975	.0025	.4975	.9950
2.25	.9878	.0122	.4878	.9756	2.82	.9976	.0024	.4976	.9952
2.26	.9881	.0119	.4881	.9762	2.83	.9977	.0023	.4977	.9953
2.27	.9884	.0116	.4884	.9768	2.84	.9977	.0023	.4977	.9955
2.28	.9887	.0113	.4887	.9774	2.85	.9978	.0022	.4978	.9956
2.29	.9890	.0110	.4890	.9780	2.86	.9979	.0021	.4979	.9958
2.30	.9893	.0107	.4893	.9786	2.87	.9979	.0021	.4979	.9959
2.31	.9896	.0104	.4896	.9791	2.88	.9980	.0020	.4980	.9960
2.32	.9898	.0102	.4898	.9797	2.89	.9981	.0019	.4981	.9961
2.33	.9901	.0099	.4901	.9802	2.90	.9981	.0019	.4981	.9963
2.34	.9904	.0096	.4904	.9807	2.91	.9982	.0018	.4982	.9964
2.35	.9906	.0094	.4906	.9812	2.92	.9982	.0018	.4982	.9965
2.36	.9909	.0091	.4909	.9817	2.93	.9983	.0017	.4983	.9966
2.37	.9911	.0089	.4911	.9822	2.94	.9984	.0016	.4984	.9967
2.38	.9913	.0087	.4913	.9827	2.95	.9984	.0016	.4984	.9968

(continued on next page)

TABLE 3 The normal distribution *(continued)*

x	A^a	B^b	C^c	D^d	x	A	B	C	D
2.96	.9985	.0015	.4985	.9969	3.49	.9998	.0002	.4998	.9995
2.97	.9985	.0015	.4985	.9970	3.50	.9998	.0002	.4998	.9995
2.98	.9986	.0014	.4986	.9971	3.51	.9998	.0002	.4998	.9996
2.99	.9986	.0014	.4986	.9972	3.52	.9998	.0002	.4998	.9996
3.00	.9987	.0013	.4987	.9973	3.53	.9998	.0002	.4998	.9996
3.01	.9987	.0013	.4987	.9974	3.54	.9998	.0002	.4998	.9996
3.02	.9987	.0013	.4987	.9975	3.55	.9998	.0002	.4998	.9996
3.03	.9988	.0012	.4988	.9976	3.56	.9998	.0002	.4998	.9996
3.04	.9988	.0012	.4988	.9976	3.57	.9998	.0002	.4998	.9996
3.05	.9989	.0011	.4989	.9977	3.58	.9998	.0002	.4998	.9997
3.06	.9989	.0011	.4989	.9978	3.59	.9998	.0002	.4998	.9997
3.07	.9989	.0011	.4989	.9979	3.60	.9998	.0002	.4998	.9997
3.08	.9990	.0010	.4990	.9979	3.61	.9998	.0002	.4998	.9997
3.09	.9990	.0010	.4990	.9980	3.62	.9999	.0001	.4999	.9997
3.10	.9990	.0010	.4990	.9981	3.63	.9999	.0001	.4999	.9997
3.11	.9991	.0009	.4991	.9981	3.64	.9999	.0001	.4999	.9997
3.12	.9991	.0009	.4991	.9982	3.65	.9999	.0001	.4999	.9997
3.13	.9991	.0009	.4991	.9983	3.66	.9999	.0001	.4999	.9997
3.14	.9992	.0008	.4992	.9983	3.67	.9999	.0001	.4999	.9998
3.15	.9992	.0008	.4992	.9984	3.68	.9999	.0001	.4999	.9998
3.16	.9992	.0008	.4992	.9984	3.69	.9999	.0001	.4999	.9998
3.17	.9992	.0008	.4992	.9985	3.70	.9999	.0001	.4999	.9998
3.18	.9993	.0007	.4993	.9985	3.71	.9999	.0001	.4999	.9998
3.19	.9993	.0007	.4993	.9986	3.72	.9999	.0001	.4999	.9998
3.20	.9993	.0007	.4993	.9986	3.73	.9999	.0001	.4999	.9998
3.21	.9993	.0007	.4993	.9987	3.74	.9999	.0001	.4999	.9998
3.22	.9994	.0006	.4994	.9987	3.75	.9999	.0001	.4999	.9998
3.23	.9994	.0006	.4994	.9988	3.76	.9999	.0001	.4999	.9998
3.24	.9994	.0006	.4994	.9988	3.77	.9999	.0001	.4999	.9998

3.25	.9994	.0006	.4994	.9988	3.78	.9999	.0001	.4999	.9998
3.26	.9994	.0006	.4994	.9989	3.79	.9999	.0001	.4999	.9998
3.27	.9995	.0005	.4995	.9989	3.80	.9999	.0001	.4999	.9999
3.28	.9995	.0005	.4995	.9990	3.81	.9999	.0001	.4999	.9999
3.29	.9995	.0005	.4995	.9990	3.82	.9999	.0001	.4999	.9999
3.30	.9995	.0005	.4995	.9990	3.83	.9999	.0001	.4999	.9999
3.31	.9995	.0005	.4995	.9991	3.84	.9999	.0001	.4999	.9999
3.32	.9995	.0005	.4995	.9991	3.85	.9999	.0001	.4999	.9999
3.33	.9996	.0004	.4996	.9991	3.86	.9999	.0001	.4999	.9999
3.34	.9996	.0004	.4996	.9992	3.87	.9999	.0001	.4999	.9999
3.35	.9996	.0004	.4996	.9992	3.88	.9999	.0001	.4999	.9999
3.36	.9996	.0004	.4996	.9992	3.89	.9999	.0001	.4999	.9999
3.37	.9996	.0004	.4996	.9992	3.90	1.0000	.0000	.5000	.9999
3.38	.9996	.0004	.4996	.9993	3.91	1.0000	.0000	.5000	.9999
3.39	.9997	.0003	.4997	.9993	3.92	1.0000	.0000	.5000	.9999
3.40	.9997	.0003	.4997	.9993	3.93	1.0000	.0000	.5000	.9999
3.42	.9997	.0003	.4997	.9994	3.94	1.0000	.0000	.5000	.9999
3.43	.9997	.0003	.4997	.9994	3.95	1.0000	.0000	.5000	.9999
3.45	.9997	.0003	.4997	.9994	3.96	1.0000	.0000	.5000	.9999
3.46	.9997	.0003	.4997	.9995	3.97	1.0000	.0000	.5000	.9999
3.47	.9997	.0003	.4997	.9995	3.98	1.0000	.0000	.5000	.9999
3.48	.9997	.0003	.4997	.9995	3.99	1.0000	.0000	.5000	.9999

[a] $A(x) = \Phi(x) = Pr(X \le x)$, where X is a standard normal distribution.
[b] $B(x) = 1 - \Phi(x) = Pr(X > x)$, where X is a standard normal distribution.
[c] $C(x) = Pr(0 \le X \le x)$, where X is a standard normal distribution.
[d] $D(x) = Pr(-x \le X \le x)$, where X is a standard normal distribution.

Question 2

1 pts

A study looking at breast cancer in women compared cases with non- cases, and found that 75/100 cases did not use calcium supplements compared with 25/100 of the non-cases. The exposure and odds ratio are:

- ◯ Breast cancer, 9

- (●) Calcium supplements, 3
- ( ) Breast cancer, 3
- ( ) Calcium supplements, 9

Question 3 — 1 pts

Which one of following statements is TRUE about the definition of an outlying value in a boxplot?

- ( ) x > upper quartile + 2.0 × (upper quartile – lower quartile) or x < lower quartile – 2.0 × (upper quartile – lower quartile)
- ( ) x > upper quartile + 3.0 × (upper quartile – lower quartile) or x < lower quartile – 3.0 × (upper quartile – lower quartile)
- ( ) x > upper quartile + 3.5 × (upper quartile – lower quartile) or x < lower quartile – 3.5 × (upper quartile – lower quartile)
- (●) x > upper quartile + 1.5 × (upper quartile – lower quartile) or x < lower quartile – 1.5 × (upper quartile – lower quartile)

Question 4 — 1 pts

The advantage of point estimation are:

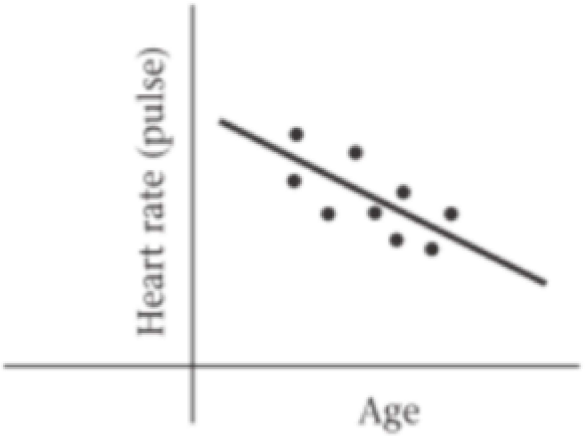
(can choose more than one answer)

- [ ] Its expression is more concise.
- [ ] It provides more information.
- [x] It can provide information about estimation errors and the degree of certainty.
- [ ] Its expression is more intuitive.
- [x] It can provide specific estimates of overall parameters.

Question 5

1 pts

Which one of following statements about the given regression line (figure below) is TRUE?



$y = \alpha + \beta x + e$

- ○ Slope β >0, variance $\sigma^2 = 0$, there is a linear relationship between age and heart rate and the regression line is a perfect fit.
- ○ Slope β <0, variance $\sigma^2 \neq 0$, there is a linear relationship between age and heart rate and the regression line is a perfect fit.
- ○ Slope β >0, variance $\sigma^2 \neq 0$, there is a linear relationship between age and heart rate and the regression line is a perfect fit.
- ◉ Slope β <0, variance $\sigma^2 \neq 0$, there is a linear relationship between age and heart rate and the regression line is an imperfect fit.

Question 6

1 pts

A man runs 1 mile approximately once per weekend. He records his time over an 18-week period. The individual times and summary statistics are given in the following table. What is the mean 1 mile running time from the first 5 weeks [WK1 ---- WK5] to week?

TABLE 2.14 One mile running time for an individual.

over 18 weeks

WK	Time (min)(x_i)	WK	Time (min)(x_i)
1	12.80	10	11.57
2	12.20	11	11.73
3	12.25	12	12.67
4	12.18	13	11.92
5	11.53	14	11.67
6	12.47	15	11.80
7	12.30	16	12.33
8	12.08	17	12.55
9	11.72	18	11.83

- (●) 12.192
- ( ) 12.21
- ( ) 12.113
- ( ) 12.09

Question 7

1 pts

Sudden death is an important, lethal cardiovascular endpoint. Most previous studies of risk factors for sudden death have focused on men. Looking at this issue for women is important as well. For this purpose, data were used from the Framingham Heart Study. Several potential risk factors, such as age, blood pressure, and cigarette smoking, are of interest and need to be controlled for simultaneously. Therefore, a multiple logistic-regression model was fitted to these data, as shown in the following table. Compute the OR relating the additional risk of sudden death per 100-centiliter (cL) decrease in vital capacity after adjustment for the other risk factors.

Risk factor	Regression coefficient, $\hat{\beta}_I$	$se(\hat{\beta}_I)$
Constant	–15.3	
Systolic blood pressure (mm Hg)	0.0019	0.0070
Framingham relative weight (%)	–0.0060	0.0100
Cholesterol (mg/100 mL)	0.0056	0.0029
Glucose (mg/100 mL)	0.0066	0.0038
Cigarette smoking (cigarettes/day)	0.0069	0.0199
Hematocrit (%)	0.111	0.049
Vital capacity (cL)	–0.0098	0.0036
Age (years)	0.0686	0.0225

Source: Arthur Schatzkin et al., "Sudden Death in the Framingham Heart Study: Differences in Indidence and Risk Factors by Sex and Coronary Disease Status, *American Journal of Epidemiology*, 1984 *120*: 888-899.

- (◉) 2.7
- ( ) 0.0036
- ( ) 9.8
- ( ) 0.0098

Question 8

1 pts

Amelie has balloons from two different brands. She wants to test the durability of each brand by measuring the volume of water that can be pumped into the balloons before they burst. Here is a summary of the results:

Which of the following would be an appropriate test statistic for Amelie's test?

Brand A Brand B

Mean	10.2 L	11.8 L
Standard deviation	1.2 L	0.9 L
Number of balloons	8	8

Formula for the test statistic

$$t = \frac{\text{sample difference} - \text{hypothesized difference}}{\text{standard error of the difference}}$$

$$= \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

The difference $\mu_1 - \mu_2$ comes from the null hypothesis. In this type of test, difference in the population means, so we can substitute 0 for $\mu_1 - \mu_2$.

$\bar{x}_1$ and $\bar{x}_2$ are the two sample means.

s_1 and s_2 are the two sample standard deviations.

n_1 and n_2 are the two sample sizes.

- ○ $t = \frac{11.8-10.2}{\frac{1.0}{\sqrt{8}}}$
- ○ $t = \frac{10.2-11.8}{\frac{1.2^2}{\sqrt{8}} + \frac{0.9^2}{\sqrt{8}}}$
- ○ $t = \frac{10.2-11.8}{\frac{1.2^2}{8} + \frac{0.9^2}{8}}$
- ◉ $t = \frac{10.2-11.8}{\sqrt{\frac{1.2^2}{8} + \frac{0.9^2}{8}}}$

Question 9 1 pts

Which of the following description is/are for the continuous random variables?

(can choose more than one options)

- [x] The height of a person.
- [ ] All possible points after throwing a dice.
- [ ] The number of calls received by the call center in a certain time period.
- [x] The length of a rope.
- [x] The waiting time for the next bus coming.

Question 10

1 pts

All the following increase the width of a confidence interval except:

- ○ Increased variability
- ◉ Increased sample size
- ○ Increased confidence level
- ○ Decreased sample size

Question 11

1 pts

A man runs 1 mile approximately once per weekend. He re-cords his time over an 18-week period. The individual times and summary statistics are given in the following table. Suppose we construct a new variable called time_50 = 50×time (e.g., for week 1, time_50 = 640). What is the mean of time_50 from the first 5 weeks [WK1 ---- WK5] to week?

TABLE 2.14 One mile running time for an individual.

over 18 weeks

WK	Time (min)(x_i)	WK	Time (min)(x_i)
1	12.80	10	11.57
2	12.20	11	11.73
3	12.25	12	12.67
4	12.18	13	11.92
5	11.53	14	11.67
6	12.47	15	11.80
7	12.30	16	12.33
8	12.08	17	12.55
9	11.72	18	11.83

- ○ 302.825
- ○ 304.8
- ◉ 609.6
- ○ 605.65

Question 12

1 pts

The sample correlation between variables is _____ if correlation coefficient (r) is greater than 0.

positively correlated

Question 13

1 pts

_____ is the 50th percentile, which is a special case of a quantile.

Median

Question 14

1 pts

The logit transformation logit(p) is defined as logit(p) = _____

ln[p/(1-p)]

Question 15

1 pts

Influential points and _____ are supposed to have an important influence on the goodness of fit of a regression line.

outlier

Question 16

1 pts

Squared and summation of the squared deviations:

Let Total Sum of Squares (Total SS), Within Sum of Squares (Within SS), Between Sum of Squares (Between SS),

Total SS ___ (operator) Within SS = Between SS

-

Question 17

1 pts

1. For the following table, Cough first thing in the morning in a group of schoolchildren, as reported by the child and by the child's parents (Bland et al. 1979)

Parents' Report	Child's Report		Total
	Yes	No	
Yes	29	104	133
No	172	5097	5269
Total	201	5201	5402

In chi-squared test, expected value in (2,2) cell is _____. (to 2 decimal places)

5072.95

Question 18

1 pts

Multiple Comparisons—Bonferroni Approach aims to avoid too many ____ (falsely/truly) significant difference

falsely

Question 19

1 pts

For Table 1, Cough first thing in the morning in a group of schoolchildren, as reported by the child and by the child's parents (Bland et al. 1979)

Table 1

Parents' Report	**Child's Report**		**Total**
	Yes	**No**	
Yes	29	104	133
No	172	5097	5269
Total	201	5201	5402

In chi-squared test, expected value in (1,1) cell is _____ (two decimal place).

4.95

Question 20 1 pts

There are two procedures for comparing two means from independent, normally distributed samples. The first step is to test for the equality of the two variances, using the ____ test. If this test is not significant, then use the ____ test with equal variances, otherwise, use the ____ test with unequal variances.

F, t, t

Question 21 1 pts

As for the outbreak of salmonella, 213 (39%) of 571 attending lunch became ill and 12 (7%) of 165 not attending lunch became ill, the relative risk = _____

5.129

Question 22

1 pts

The Fisher's exact test for a 2 by 2 contingency table is valid only if all the expected frequencies are greater than five.

- ○ True
- ◉ False

Question 23

1 pts

Range is not sensitive to outliers and is not greatly affected by the sample size.

- ○ True
- ◉ False

Question 24

1 pts

Nonparametric statistical methods: Make fewer assumptions about the distributional shape.

- ◉ True
- ○ False

Question 25 1 pts

In a two-sample hypothesis-testing problem, the underlying parameters of two different populations, either of whose values must be assumed known, are compared.

- ○ True
- ◉ False

Question 26 1 pts

In a two-sample problem, two different distributions are compared.

- ◉ True
- ○ False

Question 27 1 pts

The disease-odds ratio is the odds in favor of disease for the exposed group divided by the odds in favor of disease for the unexposed group.

- ◉ True
- ○ False

Question 28

1 pts

In order to perform a T test, it is required that the distribution of the sample mean, rather than the data values of the variable, follows a normal curve.

- (◉) True
- ( ) False

Question 29

1 pts

A retrospective study is much less expensive to perform and can be completed in much less time than a prospective study.

- (◉) True
- ( ) False

Question 30

1 pts

In a two-sample hypothesis-testing problem, the underlying parameters of two different populations, either of whose values must be assumed known, are compared.

- ( ) True
- (◉) False

Question 31

1 pts

The standard chi-squared test for a 2 by 2 contingency table is valid only if all the expected frequencies are greater than five.

- (●) True
- ( ) False

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