Normal and Uniform Distributions

1. Draw a picture of a normal distribution.

2. Describe in words the shape of a normal distribution.

In a normal distribution, what percent of the values lie:

3. below the mean? _____	5. within one standard deviations of the mean? _____
4. above the mean? _____	6. within two standard deviations of the mean? _____
	7. within three standard deviations of the mean? _____

8. What types of data tend to be normal distributed?

9. Give at least 3 examples of normally distributed data. (Include the web address or a citation)

10. Draw a picture of a normal distribution that is skewed left.	12. Draw a picture of a normal distribution that is skewed right.
11. Give an example of skewed left normally distributed data. (Include the web address or citation)	13. Give an example of skewed right normally distributed data. (Include the web address or citation)

14. Draw a picture of a uniform distribution.	15. Describe in words the shape of a uniform distribution.

16. The probabilities of equal spanned intervals are _____ in a uniform distribution.

Normal Data and Z-Scores

Z-scores carry with them a lot of information when the data set is normal (or close to normal)

It shouldn't be surprising that z-scores and probability are related since they both refer to how likely a value is to appear (i.e. how rare or how common it is.) Each z-score has an associated probability.

How do I convert a z-score to a probability?

First method: Use a z-score table

Find the ones place and tenths place in the first column, find the hundredths place in the first row. Where the row and column meet is the probability.

Example: z=1.32 (0.02)

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
(1.3 →) 1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817

1. The probability associated with z=0.68 is _____ and with z=1.75 is _____

Second Method: Use an online program

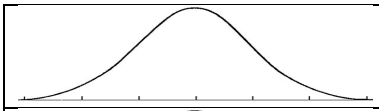
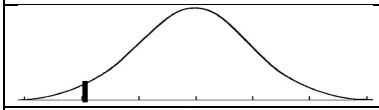
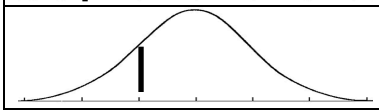
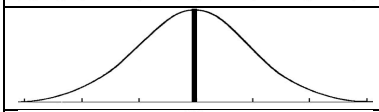
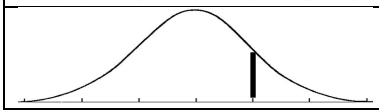
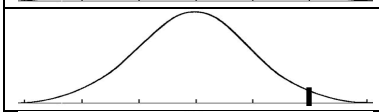
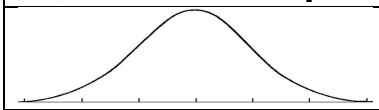
Example: http://stattrek.com/online-calculator/normal.aspx

Input: mean, standard deviation and z-score (z) Input: mean, st. dev. and probability P(Z<z)

Output: probability P(Z<z) Output: z-score (z)

What does this probability mean?

2. Find the probabilities for the z-scores pictured

	Z-score= -3	Probability=
	Z-score= -2	Probability=
	Z-score= -1	Probability=
	Z-score= 0	Probability=
	Z-score= 1	Probability=
	Z-score= 2	Probability=
	Z-score= 3	Probability=

At first glance this may not make any sense, a z-score of -3 is very rare and as rare as a z-score of 3, yet the probabilities are 0.0013 (very low) and 0.9987 (very high). Also a z-score of 0 is on the mean and the mean doesn't mean that 50% of the data is equal to the mean.

So what is going on?

3. Think about the normal curve as a probability density curve. When finding probabilities using the probability density curve, you were never asked to find the probability of a specific single value. Why not?

4. Looking at your answers to #2 and #3, explain what each associated probability means.

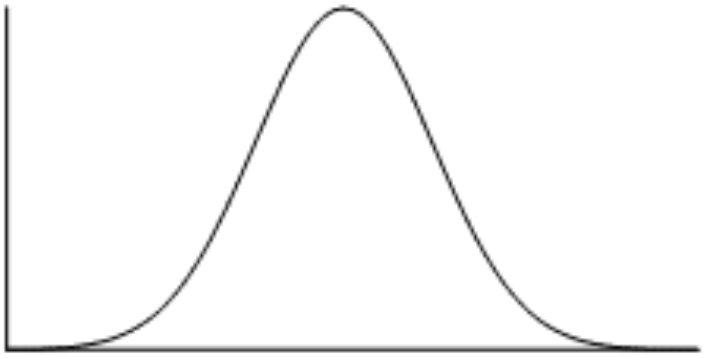
Examples:

6. The typical home doorway height is 80 inches (6 feet 8 inches). If the height of adult males is normally distributed with a mean of 69.0 inches (5 feet 9 inches) and a standard deviation of 2.8 inches, what percentage of men can walk through a typical doorway without bending down or bumping their head?

a) Find the z-score

b) Shade the area on the graph

c) Find the probability
(use the z-score table or online calculator)

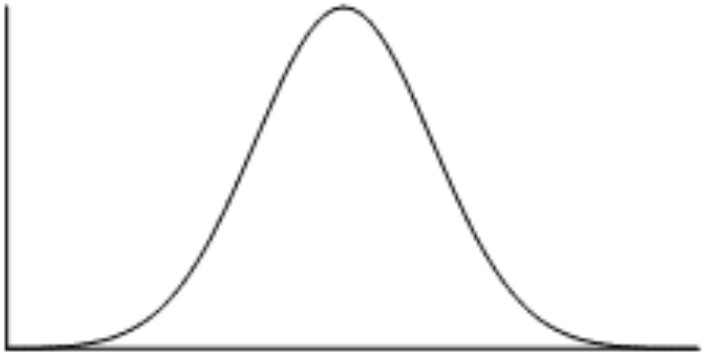


7. A little harder example: Vending machines are designed to accept quarters that are between 5.550 grams and 5.790 grams. If US quarters have a mean of 5.670 grams and a standard deviation of 0.062 grams, what percentage of the quarters will the vending machine accept?

a) Find the z-score(s)

b) Shade the area on the graph

c) Find the probability
(use the z-score table or online calculator)



How do I take a probability and find the corresponding data value?

Now we are trying to go in the other direction.

Step 1: Go from probability to z-score using the table or an online calculator

Step 2: Go from a z-score to a data point by using $z = \frac{x-\mu}{\sigma}$ and solving for the value of x

Example:

8. The hip width of males has a mean of 14.4 inches and a standard deviation of 1.0 inches. How wide should an airplane seat be to fit 97% of all males?

Z-score is _____

Seat width _____

9. A little harder example: (hint: this one has an upper and a lower limit)

Butt-to-knee length has a mean of 23.1 inches and a standard deviation of 1.2

Theater seats are designed to be comfortable for as many adults as possible. If the seats are required to fit the middle 80% of the population, the seat must be comfortable for what butt-to-knee length range?

NEGATIVE *z* Scores

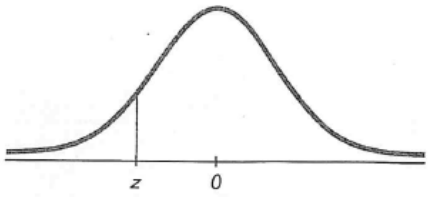


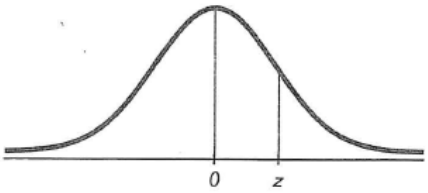
TABLE A-2 Standard Normal (z) Distribution: Cumulative Area from the LEFT

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−3.50 and lower	.0001									
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
−2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
−2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
−2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	* .0049	.0048
−2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
−2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
−2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
−2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
−2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
−1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
−1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
−1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
−1.6	.0548	.0537	.0526	.0516	.0505	* .0495	.0485	.0475	.0465	.0455
−1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
−1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
−1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
−1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
−1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
−1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
−0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

NOTE: For values of z below −3.49, use 0.0001 for the area.

*Use these common values that result from interpolation:

z score	Area
−1.645	0.0500
−2.575	0.0050



POSITIVE *z* Scores

TABLE A-2 (*continued*) Cumulative Area from the LEFT

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495 *	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949 *	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998
3.50 and up	.9999									

NOTE: For values of *z* above 3.49, use 0.9999 for the area.

*Use these common values that result from interpolation:

z score	Area
1.645	0.9500
2.575	0.9950

Common Critical Values

Confidence Level	Critical Value
0.90	1.645
0.95	1.96
0.99	2.575

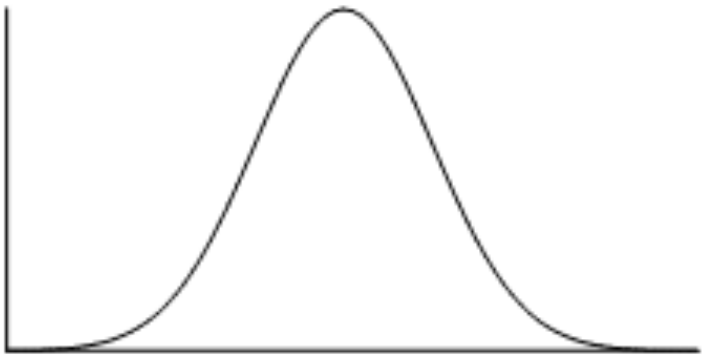
Z-scores and probability homework

1. Scores on an IQ test are normally distributed with a standard deviation of 15 and a mean of 100. What percent of people have an IQ above 120?

a) Find the z-score

b) Shade the area on the graph

c) Find the probability
(use the z-score table or online calculator)

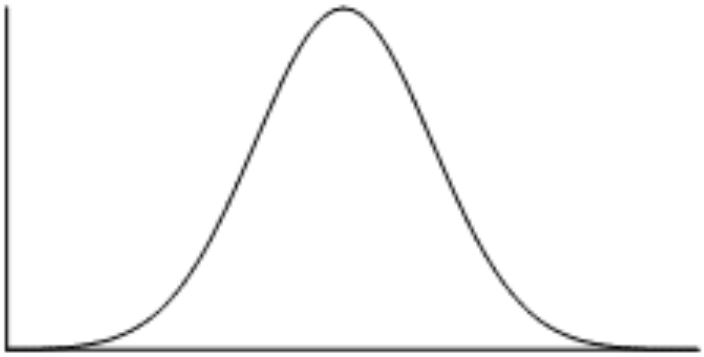


2. Years of service at a local factory follows a normal curve with a mean of 10.2 and a standard deviation 4.1. If full coverage health insurance kicks in after 3 years and decreases at 20 years, what percentage of the workforce requires the company to pay for full coverage health insurance?

a) Find the z-score(s)

b) Shade the area on the graph

c) Find the probability
(use the z-score table or online calculator)



3. According to the National Association of Builders, the mean square footage for a single family home in the US is 2392 square feet with a standard deviation of 760 square feet. What is the largest square footage a home can have to be in the lowest third of square footage.

Note: 1/3 is approximately 0.33333

Z-score is _____

Largest square footage _____

4. You want to knit hats for newborns at your local hospital. Head circumference follows a normal curve with mean of 36.034 cm and a standard deviation of 1.68 cm. If you want your hats to fit 90% of all newborn's heads, what head sizes does it need to fit? data from Medscape.com

Midterm Review I

Do All Work On A Separate Sheet Of Paper

1. What is the difference between each pair of words (use examples if that helps you explain it.)

Experiment versus variable

Population versus sample

Causation versus coorelation

Raw data versus rates

2. Explain the law of large numbers when it is used to analyze characteristics of a population?

3. What is the sample space for the question "What is your eye color?"

4. You are trying to gather data on whether or not people in your town agree or disagree with a proposed law that would require mandatory drug testing for all liquor store employees. There are 55,000 people in this town and you figure you can interview up to 200 people.

a) Write a question that would encourage people to agree with the proposed law.

b) Write a question that would encourage people to disagree with the proposed law.

c) Write a question that is as unbiased as you can make it.

d) Who might you ask if you want to imply the town agrees with the proposed law?

e) Who might you ask if you want to imply the town disagrees with the proposed law?

f) Who might you ask if you want to find out if the town agrees or disagrees with the proposed law?

5. a) Which set of data is the most convincing that gas stations <u>are not</u> price fixing (price fixing means all stores have agreed to charge the same amount so we all have to pay more)?

b) Which set of data is the most convincing that gas stations <u>are</u> price fixing?

Data set J: mean=4.23, standard deviation=1.03

Data set K: mean=4.23, standard deviation=0.04

Data set L: mean=4.23, standard deviation=0.5

6. A study was conducted and the following computations were done.

Mean=8.27, sample standard deviation=4.9, median=8.2, Q1=3.45, Q3=10.5, range=15.02, coefficient of variation=0.599, probability of a randomly selected data point lying between 7 and 10=0.337

It turns out that the researcher ignored outliers.

a) Amy claims there was one really low data point thrown out. How would putting that point back in affect all of the above calculations?

b) Bob claims that was one really high data point thrown out. How would putting that point back in affect all of the above calculations?

c) Callie claims there was one data point at 58.27 and one data point at -41.73. How would putting those points back in affect all of the above calculations?

7. A study was conducted and one data point was not used. If the data point not used did not affect the mean but changed the standard deviation, what is that data point? And how would the standard deviation change?

8. In analyzing the amount of parking needed at HCC, the consultant collected data every day about the number of cars on campus at 15 minutes intervals throughout the day for an entire year.
a) After inputting the data into a spreadsheet, she found the mean to be 1258 and the standard deviation to be 136. Based on this information she thinks the school should provide 1400 parking spaces. Do you agree or disagree? Why?
b) Someone else at HCC got a hold of the same data and found that the median was 941 and the quartiles were 0-524, 525-941, 941-1207, 1207-1932. She believes HCC should provide 2000 parking spaces. Do you agree or disagree? Why?

9. Susan's data has a standard deviation of 4.2 and Isabella's data has a standard deviation of 5. Susan claims that her data has more variation than Isabella's data.
a) Provide a context that would make Susan correct.
b) Choose means for Susan and Isabella's data sets that would make the coefficient of variation prove that Susan is correct.
c) Provide a different context that would make Susan incorrect.
d) Choose means for Susan and Isabella's data sets that would make the coefficient of variation prove that Susan is incorrect.

10. Sasha thinks all husky puppies have a birth weight between 1 pound and 4 pounds.
a) One study she found claims that the mean=2.5 pounds and the standard deviation is 0.75
Does the data support her claim that all husky puppies are born between 1 and 4 pounds?
b) Another study claims that the quartiles are divided as follows:
First quartile 1-1.7, second quartile 1.71-2.3, third quartile 2.3-2.5, fourth quartile 2.5-3.8
Does this data support her claim that all husky puppies are born between 1 and 4 pounds?

11. Interpret the following results. Be very specific.
a) My sister has taken the GED 4 times, her scores were all in the second quartile of GED results, except for the last attempt which was in the fourth quartile.
b) Josh is the 7^{th} decile for height of all army reserve recruits.
c) Sophia is in the 88^{th} percentile for birth weight.
d) Professor McGee scored in the 19^{th} percentile for instructor enthusiasm on her student teaching evaluations.

12. Explain the statement. There is a 0.65 chance of you getting a non-defective alarm clock out of this box, but once you pick up a clock, the probability is useless.

13. In a local restaurant, diners were asked their salaries in an attempt to describe the income level of the town.

$ 30,000 $ 30,000 $ 30,000 $ 30,000 $ 32,000 $ 35,000 $ 35,000 $ 35,000 $ 40,000 $ 40,000 $ 40,000 $ 42,000 $ 50,000 $ 50,000 $ 50,000 $ 52,000 $ 53,000 $ 61,000 $ 65,000 $12,000,000,000	Mean = 600,040,000 include units where appropriate Standard deviation = 2,683,272,158 Median = Mode = Min = Q1 = Q2 = Q3 = Max = Range =

a) If we are trying to bring in new businesses and want to show them that our residents have a lot of money to spend, which measure of central tendency should we use? Why? Which central-spread combination should we use? Why?
b) If we are trying to get the most realistic view of the individual salaries, which measure of central tendency should we use? Why? Which central-spread combination should we use? Why?
c) Give possible explanations for the outlier.

14. Interpret the following probabilities related to the predicted weather on Dec 21st. Be specific.
S=snow, R=rain, C=mostly cloudy, M=sunny
a) P(S)=0.42
b) P(R|M)=P(R given M)=0
c) P(M and S)=0.172
d) P(C or R)=0.8
e) P(E)=1, define an event E that would make sense in this situation and explain what the probability means

15.
a) Explain what a uniform density function looks like.
b) What is an example of a situation where the probability density function would be uniform?

Midterm Review II

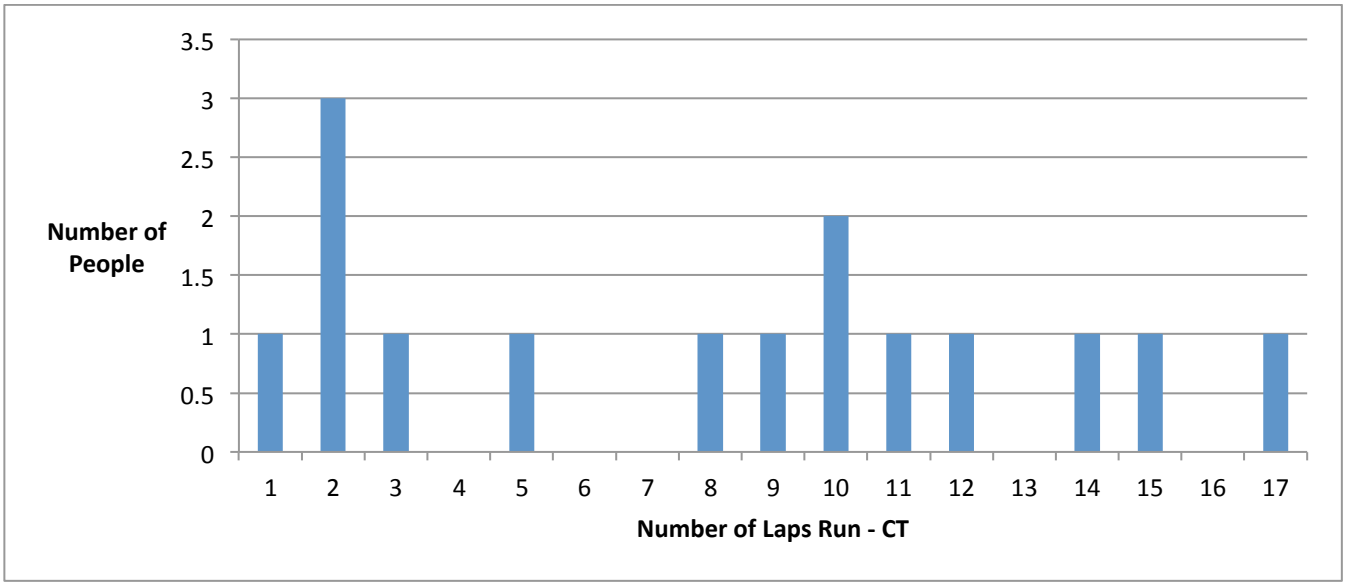
Do All Work On A Separate Sheet Of Paper

16. The following is a list of weights (in grams) of silver dollar coins

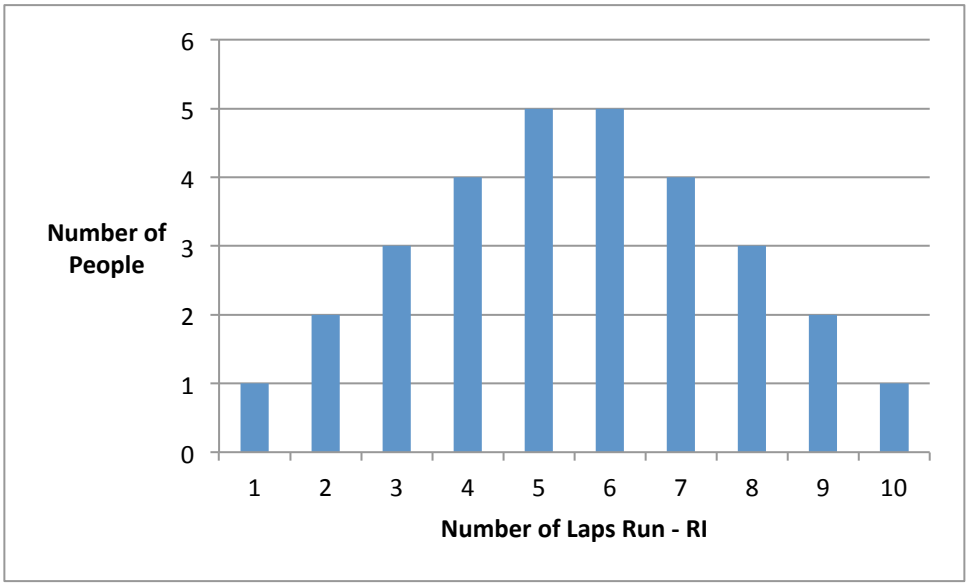
7.9817	For the data set, list below and mark on the data set each of the following items:	7.9817
8.0241		8.0241
8.0271	Note: there are two copies of the same data in case you don't want to put it all on one list.	8.0271
8.0307	Mean = 8.0710	8.0307
8.0342		8.0342
8.0345	Standard deviation = 0.041105	8.0345
8.0510	a) How many points are within one standard deviation?	8.0510
8.0538		8.0538
8.0658		8.0658
8.0719	b) How many points are within two standard deviations?	8.0719
8.0775		8.0775
8.0813		8.0813
8.0894	c) Median	8.0894
8.0954		8.0954
8.1008		8.1008
8.1041	d) Quartiles	8.1041
8.1072		8.1072
8.1238	e) Range	8.1238
8.1281		8.1281
8.1384		8.1384

17. Using the data in #16 what conclusions can you draw?

18.



a) Find the mean, the median and the mode for the CT data. Which of the three measures of central tendency is the best description of the data? Why? Which is the worst? Why?

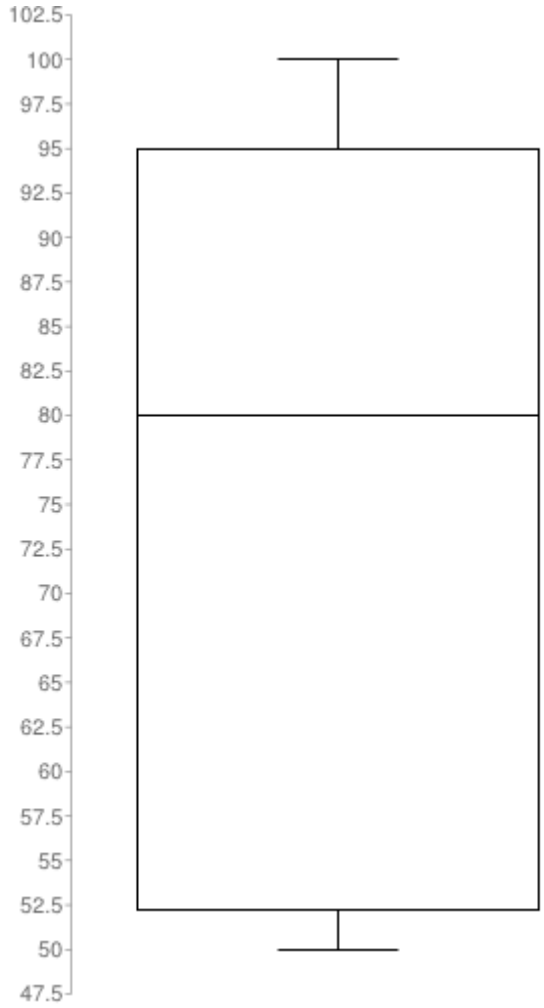


b) Find the mean, the median and the mode for the RI data . Which of the three measures of central tendency is the best description of the data? Why? Which is the worst? Why?

c) Which data set has a greater standard deviation? Why? (Do not calculate the standard deviation)

19. Using box plots to draw conclusions

a) This is a box plot of the test scores given last semester in an adult basic education class.



What conclusions can you draw?

b) This is a box plot of points scored by the HCC bowling team in each game last season.

What conclusions can you draw?

20. You took a survey of 50 people and you are comparing the number of TVs per household to whether or not the person lives alone. Here is a tabulation of the data

	Number of working TVs in the home				
	0	1	2	3	4 or more
Living Alone	1	4	12	0	2
Not Living Alone	2	3	2	12	12

a) Find the percentage of people who live alone and have 1 TV

b) Find the percentage of people who live alone or have 3 TVs

c) Find the percentage of living alone people who have 1 TV

d) Find the percentage of 2 TV people who do not live alone

e) Find the percentage of people who have at least 1 TV

f) Find the percentage of people who have more than 2 TVs

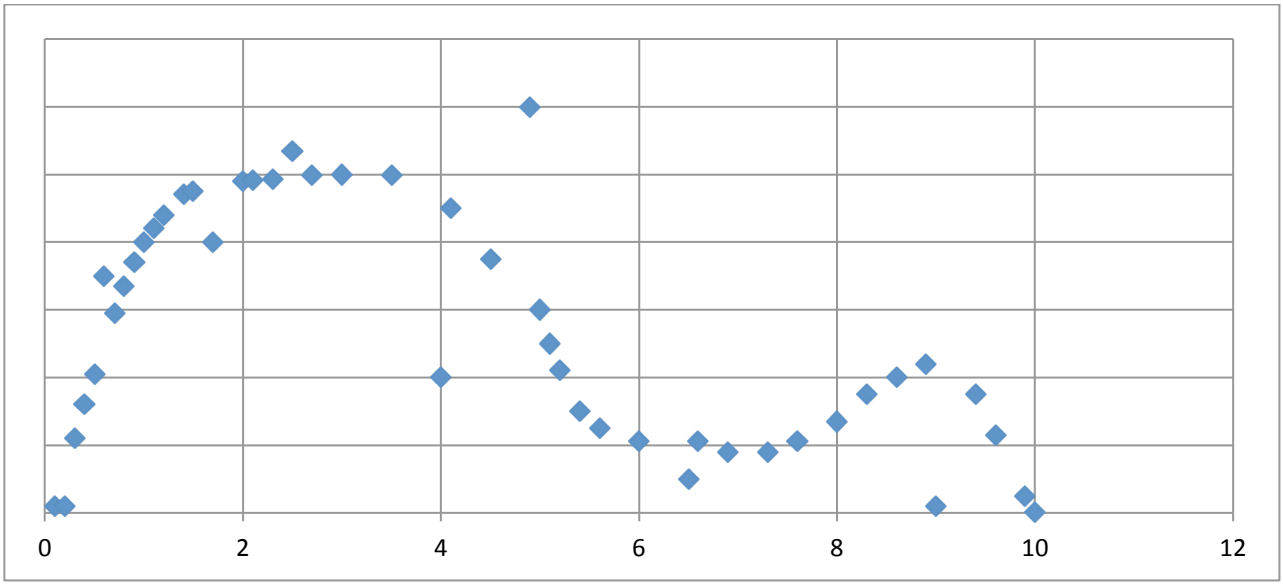
g) The average number of TVs per household is at least 2.54 Why is the average not exact and why is it "at least" and not "at most"?

h) What conclusions can you draw from this data?

21. a) Explain what a normal density function looks like. What is an example of a situation where the probability density function would be normal?

b) Explain what it means for data to be skewed when referring to a normal density function.

22. The following is a graph of the distance (in miles) students travel to get to school.



a) Use the given data to create a probability density function (i.e. draw the curve)

Use the probability density function to answer the following questions:

b) What interval of 1 mile is a student most likely to traveling? Why?

c) What is the probability that a randomly selected student must travel between 8 and 10 miles to get to school?

d) What is the probability that a randomly selected student will travel at most 1 mile?

e) What is the probability that a randomly selected student will travel at least 5 miles?

f) What is the probability that a randomly selected student will travel between 0 and 1 miles or 9 and 10 miles?

g) What is the probability that a randomly selected student will travel between 3 and 4 miles given they live less than 5 miles from school?

23. You are buying a special type of flooring for your business that is sold is sections called mats. The mats are advertised as 2.5" thick but they are not all perfectly 2.5" thick. You know to stay up to code you must only use mats that are between 2.44" and 2.56" thick. The two major competitors, who make these mats, make vast amounts of them and it can be assumed that the distribution of thicknesses is approximated by a *normal* curve. You are planning to buy 100,000 mats.

Expensive Company: $6 per mat, mean=2.5, standard deviation=0.02

Cheap Company: $5.50 per mat, mean=2.5, standard deviation=0.03

a) How many of the 100,000 would you not be able to use for each company?

b) How much would the mats you throw out cost you?

c) Which company would you buy from a why?

24. What does a z-score tell you?

a) In Adam's data, he found that 5.4 had a z-score of 0.02 What can he conclude?

b) Also in Adam's data, he found that 2.08 had a z-score of -2.8 What can he conclude?

25. Use the formula $z = \frac{x-\mu}{\sigma}$

a) Find the z-score for a grade of 87% if the school grades have a mean of 75% with a standard deviation of 10%.

b) What grade would have a z-score of -0.82?

26. Which end of this trade is a better deal if the biggest concern is scoring?

P.L. Smith was traded for J.M. Doe and U.E. Robin

Points per game	Game 1	Game 2	Game 3	Game 4	Game 5	Game 6	Game 7	Game 8	Game 9	Game 10
P.L.	30	32	12	40	5	26	30	36	20	15
J.M.	12	16	15	20	17	10	14	12	8	11
U.E.	10	8	9	4	6	12	8	12	14	13

27. I.Q. scores have a mean of 100, a standard deviation of 15 and are normal data. To be eligible to join Mensa, you must have an I.Q. score of at least 131.

a) What percentage of the international population is eligible for membership into Mensa?

b) If they wanted to include everyone 20% of the population, what would be the minimum I.Q. score needed?

28. For each of the statements a) what do you think the author is hoping you will conclude?
b) why you should doubt that conclusion?

I. At the last count, 37% of Americans had passports. The comparative figure in the UK is 71%.

II. Statistics show that you're more likely to be hospitalized with an injury from a high speed collision if you're wearing a seat-belt.

III. Most car accidents happen within 25 miles of home

VI. People who switched to insurance company A saved an average of $500/year.

29. Evaluate using your calculator: $\sqrt{\frac{(6.5-0.83)+(0.903-1.04)^2}{\frac{4}{7}\times\frac{9.43+0.032}{0.56}+2}}$ and $\frac{-3+\sqrt{4.3+2.07}}{4.5+\frac{\sqrt{0.23^2-0.01}}{9}}$