February 12, 2020

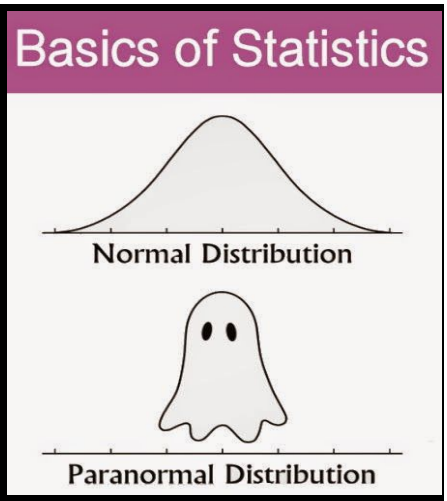
1) CALC

2) NOTES

3) HW: WS 3.2 (don't turn in)

TODAY'S SCHEDULE

1st block	8:20-9:46	86 minutes		Lunch Schedule	
Advisement	**9:52**-10:32	**36** minutes		A lunch	12:09-12:34
2nd block	10:38-12:03	85 minutes		B lunch	12:41-1:06
3rd block	12:09-2:10	121 minutes		C lunch	1:13-1:38
4th block	2:16-3:30	84 minutes		D lunch	1:45-2:10



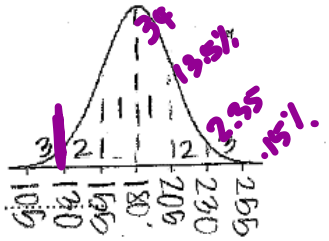
STA 2e: Sect. 3.2 Worksheet #1 Name _____
68%-95%-99.7% RULE INTERPRETING Z-SCORES

1. If a person has a negative z-score, did the person score higher or lower than the mean? lower

2. If a person has a negative z-score, it does not always mean that the person did not do well. Name a sport where having the lowest z-score would be the most desirable. track, swimming, etc

For #3 – 9: The mean weight of adult American men is 180 pounds with standard deviation of 25 pounds. The weights are approximately normally distributed. Use the 68%-95%-99.7% Rule to approximate each of the following.

3. Using the values given above, label the normal curve at the right with the numerical values for μ, μ ± σ, μ ± 2σ and μ ± 3σ.



4. What percent of all adult American men have a weight less than 130 pounds? 2.5%
2.35+0.15

5. What percent of all adult American men have a weight between 130 and 205 pounds? 81.5%
13.5+34+34

6. What percent of all adult American men have a weight less than 230 pounds? 97.5%
100-2.5=97.5

7. What percent of all adult American men have a weight less than 105 pounds? 0.15%

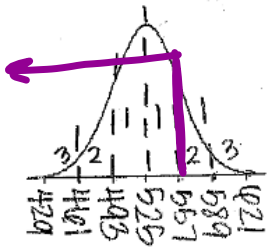
8. The heaviest 16% of all men in weight weigh more than how many pounds? 205lbs
13.5+2.35+0.15=16%

9. What weight separates the lowest 2.5% of all American men in weight from the remaining weights? 130lbs

For #10 –17: Elephants have the longest pregnancy of all mammals. One species of elephant has a mean gestation period of 525 days and standard deviation of 32 days. Pregnancy length follows an approximately normally distribution. Use the 68%-95%-99.7% Rule to approximate each of the following.

10. Using the values given above, label the normal curve at the right with the numerical values for μ, μ ± σ, μ ± 2σ and μ ± 3σ.

11. The longest 16% of all elephant pregnancies last at least how many days? 557 days



12. The middle 68% of all elephant pregnancies last between 493 and 557 days.

13. Only 2.5% of all elephant pregnancies last longer than 589 days.

14. What percent of elephant pregnancies last less than 461 days? 2.5%
2.35+0.15

15. What percent of elephant pregnancies last between 525 and 557 days? 34%
34+34+13.5

16. What percent of elephant pregnancies last between 493 and 589 days? 81.5%

17. What percent of elephant pregnancies last less than 557 days? 84%
100-(13.5+2.35+0.15)
100-16

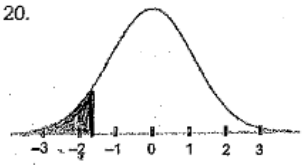
STA 2e: Sect. 3.2 Worksheet # 1 p.2

18. Maria made 75% on her Government test and 83% on her Algebra 2 test. The mean grade on the Government test was 72% with a standard deviation of 5%. The average grade on the Algebra 2 test was 81% with a standard deviation of 4%. On which test did Maria do better? *Justify your answer.*

$GOVT = \frac{75-72}{5} = 0.6$ $\quad ALG2 = \frac{83-81}{4} = 0.5$ Government

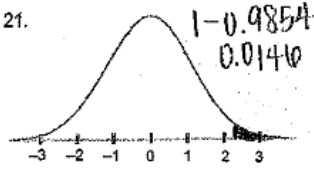
19. For a standard normal distribution, the mean μ is always ..0.. and the standard deviation σ is always ..1..

***For #20 – 25:** Use Table A (Standard Normal Distribution) to find the proportion of observations that satisfies each of the following statements. In each case, shade the area under the curve that is the answer to the question.*

20. 

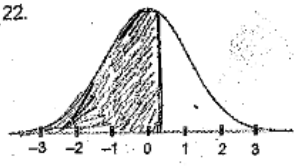
z is less than –1.83

0.03216 = 3.36%

21. 1 – 0.9854 = 0.0146


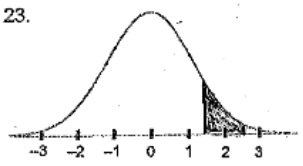
z is greater than 2.18

0.0146 = 1.46%

22. 

z is less than 0.33

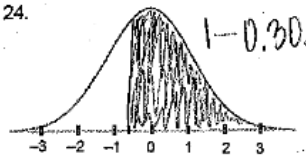
0.6293 = 62.93%

23. 

z is between 1.42 and 2.68

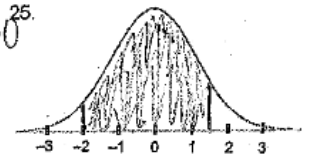
0.0141 = 7.41%

0.9963 – 0.9222

24. 

z is greater than –0.51

1 – 0.3050 = 0.6950 = 69.5%

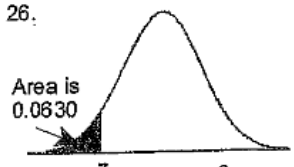
25. 

z is between –2 and 1.53

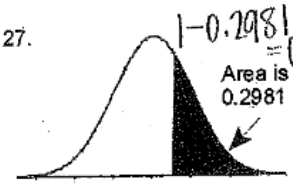
0.9142 = 91.42

0.9370 – 0.0228

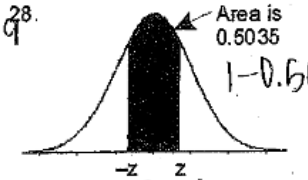
***For #26 – 28:** Find the value of z from the standard normal distribution that satisfies each of the following conditions. (Use the value of z from Table A that comes closest to satisfying the condition.)*

26. 

z = –1.53

27. 1 – 0.2981 = 0.7019


z = 0.53

28. 

$1 - 0.5035 = 0.4965$

$\frac{0.4965}{2} = 0.24825$

z = 0.68

–0.68

Topic: Percentiles of a Normal Curve **Date:** _____

What am I learning today?

Main Ideas/ Questions

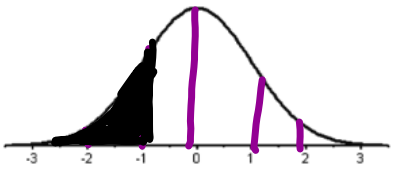
Area under the Normal Curve

Stand. Norm. Dist.

Notes

Shade the area under the curve that would satisfy each scenario.

Z-score less than -1



~ 16%.

Z-score less than 2.5

Using the Normal Table and Z-Scores

Area under the Normal Curve – The percentage of an observation happening.

*** We use Z-score (to 2 decimal places) and the Normal Table to find this probability!

*** There is a negative and positive side of the Normal Table.

The Z-score with 1 decimal is in the column on the left

The Z-score's 2nd decimal is in the row on the top

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	[illegible]	0.6026
0.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.6368	0.6406
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	[illegible]	0.6772

Z = 0.35

The Normal Table *ONLY* shows PERCENTILES. Percentiles is less than or equal to.

Find the probability using the z-score and the Normal Table above.

Example 1:
z-score less than 0.35

Z = 0.35 → p = .6368
p = 63.68%

Example 2:
z-score less than 0.01

Z = 0.01 → p = .5040

Topic: Area/Probability under the Normal Curve **Date**: _____

Main Ideas/ Questions

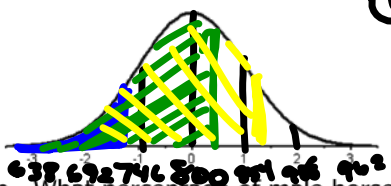
Examples

Notes

Example: The weights of a fully-grown male horse is normally distributed with an average 800 kg and a standard deviation of 54 kg.

Shade the area under the curve that would satisfy each scenario.

a. What percentage of male horses grow to be 730 kg or less?



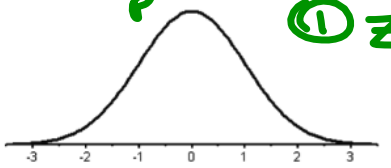
① z-score: $z = \frac{x-\bar{x}}{s_x}$

$z = \frac{730-800}{54}$

$z = -1.30 \rightarrow p = .0968$

$p = 9.68\%$

b. What percentage of male horses grow to be 815 kg or less?



① $z = \frac{815-800}{54}$

$z = 0.28 \rightarrow p = .6103$

$p = 61.03\%$

c. What percentile would a male horse be in if he weighs 860 kg?

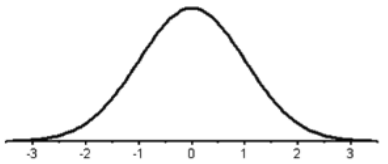
$z = \frac{860-800}{54}$

$z = 1.11 \rightarrow p = .8665$

87th percentile

d. If 2500 horses were measured in this study, how many would weigh less than 820 kg?

HOW MANY? % (TOTAL)



$z = \frac{820-800}{54}$

$z = 0.37 \rightarrow p = .6443$

$HM = .6443(2500)$

$= 1610.75$

$=$ 1611 Horses.

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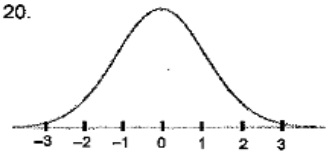
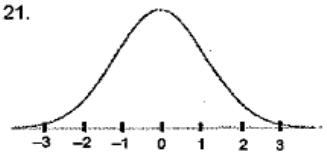


z is less than –1.83

.....

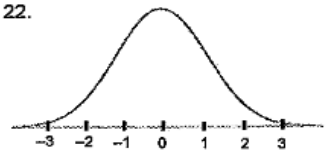
21.



z is greater than 2.18

.....

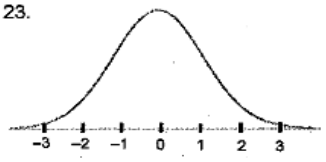
22.



z is less than 0.33

.....

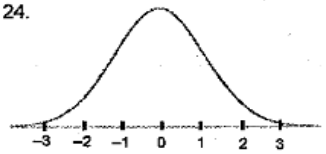
23.



z is between 1.42 and 2.68

.....

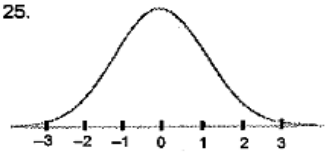
24.



z is greater than –0.51

.....

25.



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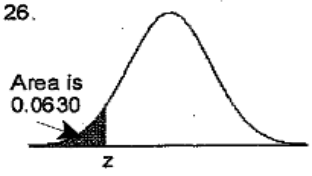
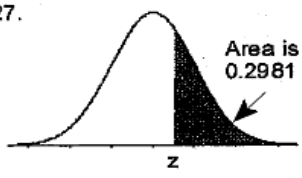


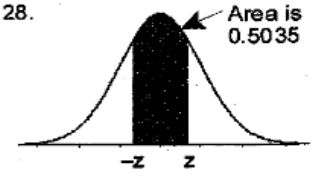
z = ...

27.



z = ...

28.



z = ...

Standard Normal Probabilities

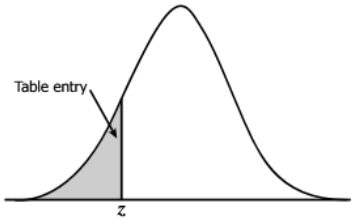


Table entry for z is the area under the standard normal curve to the left of z.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−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

Standard Normal Probabilities

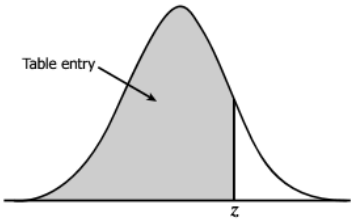


Table entry for z is the area under the standard normal curve to the left of z.

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