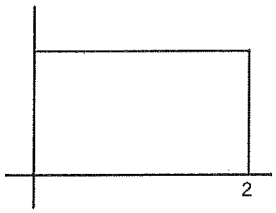
Unit 5 worksheet #1

Name Key

Hour_____

Show work!

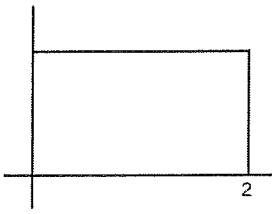
1.



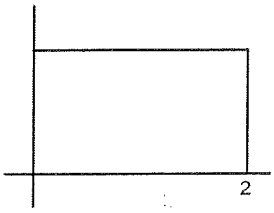
(a) What is the median this density curve?

(b) What property of this density curve tells you that the mean and median are the same?

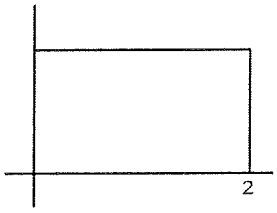
(c) What is the height of the density curve?



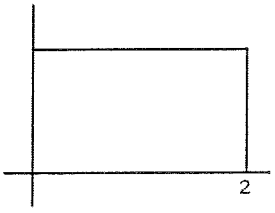
(d) What % of the data is between 0 and 0.4?



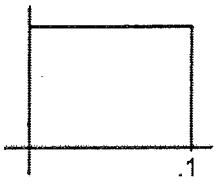
(e) What % of the data are greater than 1.5?



(f) What % of the data is between 0.5 and 1.2?

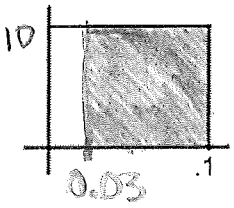


2. (a) What is the height of the density curve?



h = 10

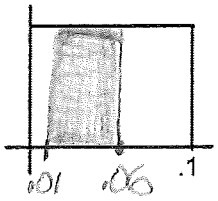
(b) What % of the data are greater than 0.03?



A = .7

70%

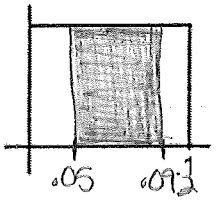
(c) What % of the data is between .01 and .06?



A = .5

50%

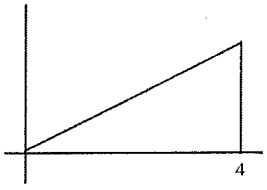
(d) What % of the data is between .05 and .092?



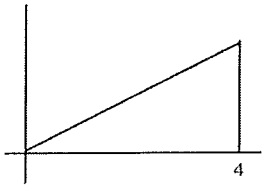
A = .42

42%

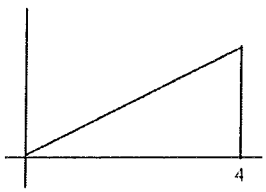
3. (a) What is the height?



(b) What % of the data are greater than 2?



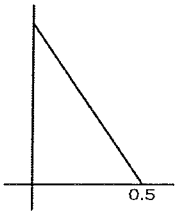
4. For the density curve shown here, which statement is true?



(a) The density curve is symmetric.
(b) The density curve is skewed right.
(c) The area under the curve is 1.
(d) The density curve is normal.
(e) None of the above is correct.

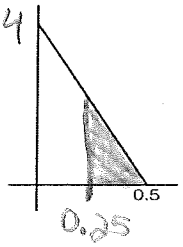
5. For the density curve shown in question 4, which statement is true?
(a)The mean and median are equal.
(b) The mean is greater than the median.
(c)The mean is less than the median.
(d) The mean could be either greater than or less than the median.

6.(a) What is the height?



h = 4

(b) What % of the data are greater than 0.25?



A = .25

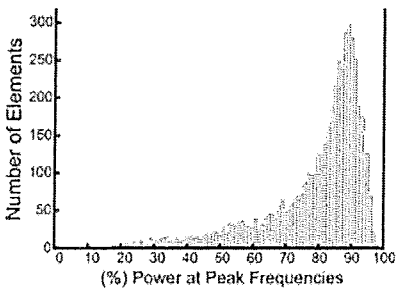
25%

7. For the density curve shown in question 6, which statement is true?
(a) The density curve is symmetric.
(b) The density curve is skewed right.
(c) The density curve is normal.
(d) None of the above is correct.

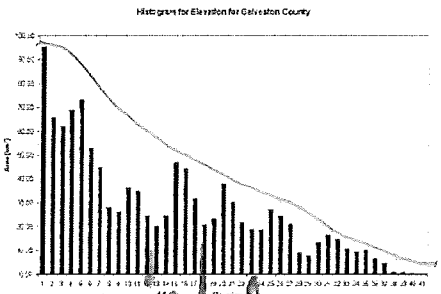
8. For the density curve shown in question 6, which statement is true?
(a) The mean and median are equal.
(b) The mean is greater than the median.
(c) The mean is less than the median.
(d) The mean could be either greater than or less than the median.

9. Do parts (a) –(d) for **each** of the following: (draw right on the histograms themselves)
(a) Sketch a smooth density curve that describes the distribution well.
(b) Identify the curve as symmetric, skewed right, or skewed left.
(c) Mark and label a vertical line where the median would fall.
(d) Mark and label a vertical line where the mean would fall.

(i)



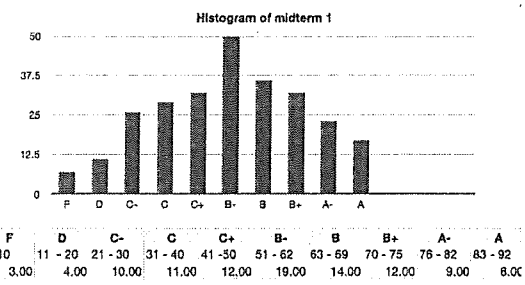
(ii)



mean med

b) Skewed right

(iii)



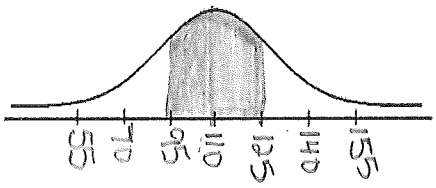
Unit 5 worksheet #2 Name Key

Hour_____

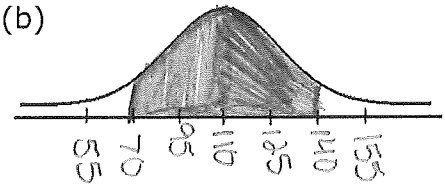
For <u>each</u> of the following: label and shade picture and use 68–95 –99.7 rule.

1. Birth weights at a local hospital have a normal distribution with a mean of 110 oz. and a standard deviation of 15 oz.

(a)



(b)

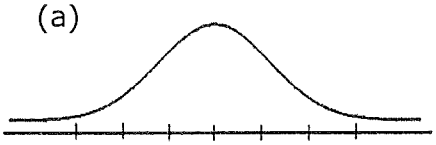


(a) What interval that contains the middle 68% of birth weights? 1a. 95 to 125

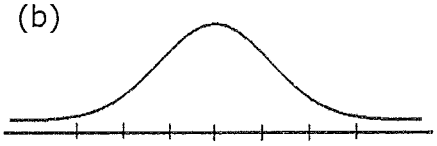
(b) What interval that contains the middle 95% of birth weights? 1b. 70 to 140

2. The distribution of the heights of young women aged 18 to 24 is normal with mean 65 inches and standard deviation 2.5 inches.

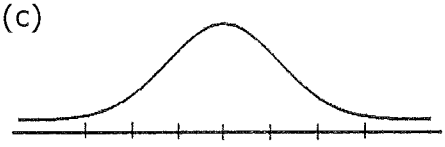
(a)



(b)



(c)



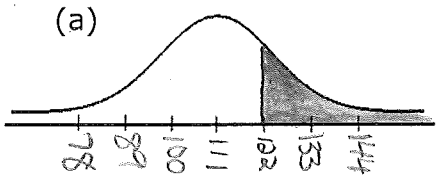
(a) What interval contains the middle 99.7% of women's heights? 2a._____

(b)What percent of women are taller than 70 inches? 2b._____

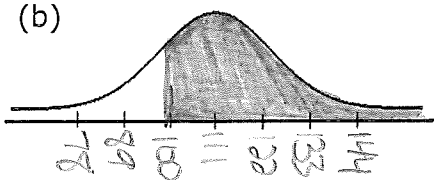
(c)What percent of women are shorter than 57.5 inches? 2c._____

3. A certain group of seventh graders have IQ scores that are approximately normal with mean 111 and standard deviation 11.

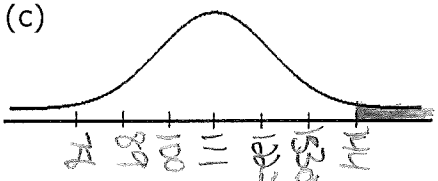
(a)



(b)



(c)

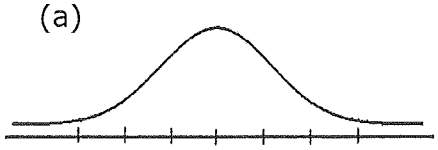


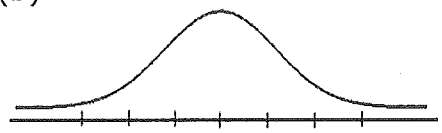
(a) What percent of the seventh graders have IQ scores more than 122? 3a. 16%

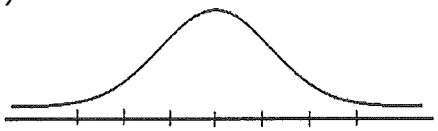
(b) What percent of the seventh graders have IQ scores more than 100? 3b. 84%

(c) What percent of the seventh graders have IQ scores more than 144? 3c. 0.15%

4. Suppose that sixteen-ounce bags of chocolate chips cookies are produced with an actual mean weight of 16.1 ounces and a standard deviation of 0.1 ounce.

(a) 

(b) 

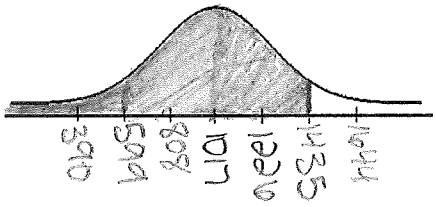
(c) 

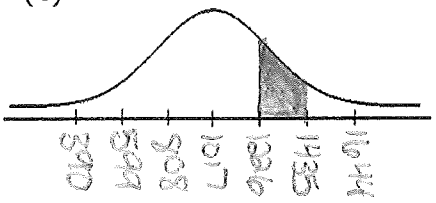
(a) What percentage of bags will contain between 16.0 and 16.1 ounces? 4a._____

(b) What percentage of bags will contain less than 16.0 ounces? 4b._____

(c) What percentage of bags that contain between 15.9 and 16.2 ounces? 4c._____

5. In 1999, the scores of millions of students taking the SATs were approximately normal with mean 1017 and standard deviation 209.

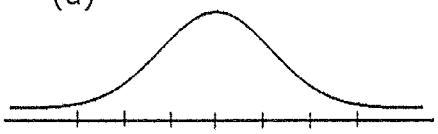
(a) 

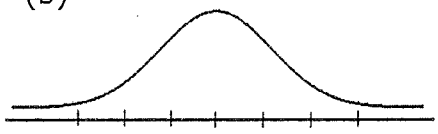
(c) 

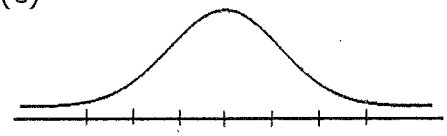
(a) What percentage of scores was lower than 1435? 5a. 97.5%

(b) What percentage of scores was between 1226 and 1435? 5b. 13.5%

6. In 1999, the scores of males taking the math portion of the SAT were approximately normal with mean 531 and standard deviation 115.

(a) 

(b) 

(c) 

(a) What percentage of scores was between 416 and 761? 6a._____

(b) What percentage of scores was between 186 and 416? 6b._____

(c) What percentage of scores was between 761 and 876? 6c._____

Unit 5 worksheet #2B

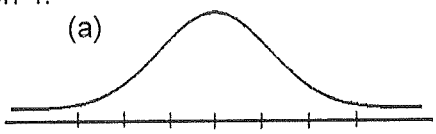
Name Key

Hour_____

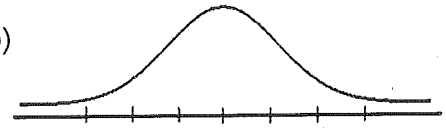
For each of the following problems **label and shade each picture** and use 68 – 95 – 99.7 rule.

1. The scores on the statistics final in 2009 were normally distributed with mean of 77 and standard deviation 4.

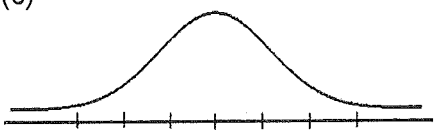
(a)



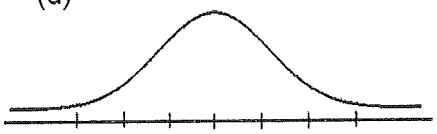
(b)



(c)



(d)



(a) What interval that contains the middle 68% of scores? 1a._____

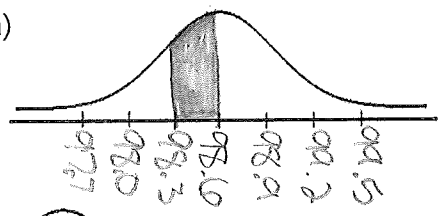
(b) What interval that contains the middle 95% of scores? 1b._____

(c) What interval contains the middle 99.7% of scores? 1c._____

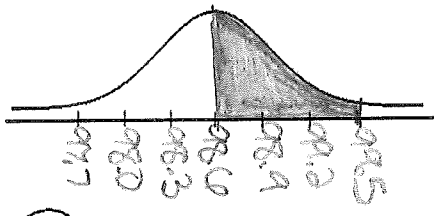
(d) What interval contains the top 50% of scores? 1d._____

2. The distribution body temperatures of humans is normal with mean 98.6 and standard deviation 0.3.

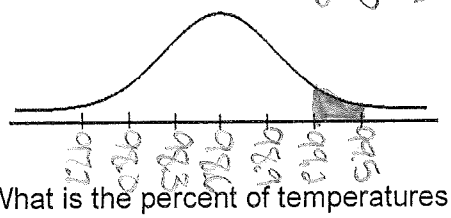
(a)



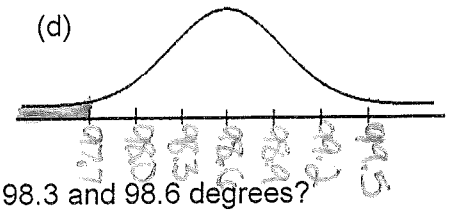
(b)



(c)



(d)



(a) What is the percent of temperatures between 98.3 and 98.6 degrees? 2a. 34%

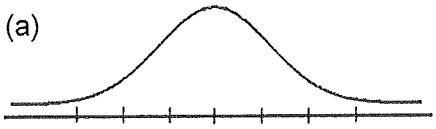
(b) What is the percent of temperatures between 98.6 and 99.5 degrees? 2b. 49.85%

(c) What is the percent of temperatures between 99.2 and 99.5 degrees? 2c. 2.35%

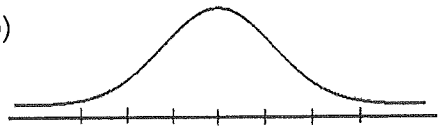
(d) What is the percent of temperatures are lower than 97.7 degrees? 2d. .15%

3. Two pound bags of peanut M & Ms have an actual mean weight of 32.2 ounces and a standard deviation of 0.1 ounces.

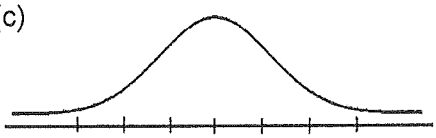
(a)



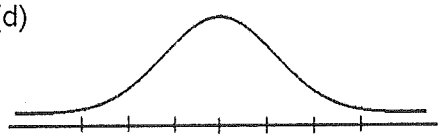
(b)



(c)



(d)



(a) What percent of bags will contain between 31.9 and 32.2 ounces? 3a._____

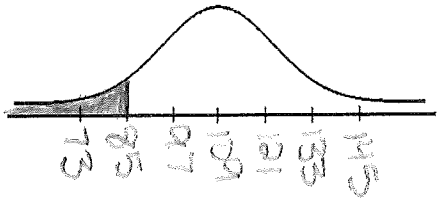
(b) What percent of bags will contain less than 32.0 ounces? 3b._____

(c) What percent of bags will contain between 32.1 and 32.5 ounces? 3c._____

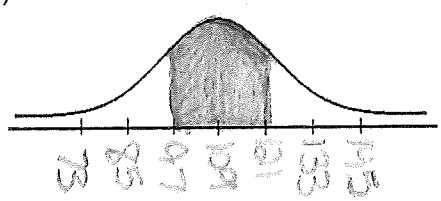
(d) What percent of bags will contain between 32.3 and 32.5 ounces? 3d._____

4. The Fred Moore 5th graders ¼ mile run times are normally distributed with a mean of *109 seconds and a standard deviation of 12 seconds.*

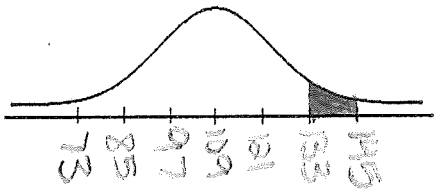
(a)



(b)



(c)



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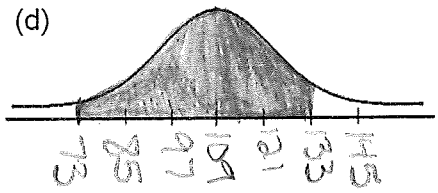


(a) What percent of students ran the ¼ mile in less than 85 seconds? 4a. 2.5%

(b) What percent of students ran the ¼ mile in 97 to 121 seconds? 4b. 68%

(c) What percent of students ran the ¼ mile in 133 to 145 seconds? 4c. 2.35%

(d) What percent of students ran the ¼ mile in 73 to 133 seconds? 4d. 97.35%

Unit 5 worksheet 3 Name Key

Hour_____

1. a) Jill scores 680 on the math portion of the SAT. These scores are normally distributed with mean 500 and standard deviation 100. Jack takes the ACT math test and scores 27. ACT scores are normally distributed with mean 18 and standard deviation 6. Find the standardized scores for both students.

Z-Score Jill: $\frac{680-500}{100} = 1.8$ Table → 96.41%

Z-Score Jack: $\frac{27-18}{6} = 1.5$ Table → 93.32%

Jack: 93.32%

Jill: 96.41%

b) Circle the better score.

For each part of #2 – 6: label and shade a picture, find the z-score, and use Table B.

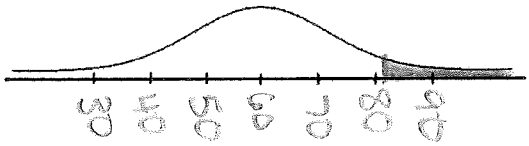
2. A company produces packets of soap powder labeled "Giant Size 32 Ounces." The actual weight of soap powder in a box has a normal distribution with a mean of 33 oz. and a standard deviation of 0.8 oz.

a) What proportion of packets weigh less than 32 oz.? 2a._____

b) What proportion of packets weigh less than 31 oz.? 2b._____

3. The length of time needed to complete a certain test is normally distributed with mean 60 minutes and standard deviation 10 minutes.

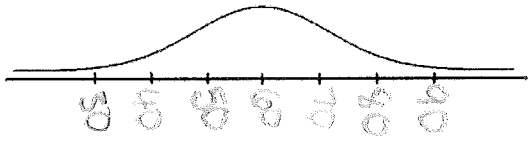
a) What percent take longer than 81 minutes to complete the test? 3a. 1.79%



$\frac{81-60}{10} = 2.1 \rightarrow 98.21\%$

$100 - 98.21$

b) What percent take longer than 73 minutes to complete the test? 3b. 9.68 %



$\frac{73-60}{10} = 1.3 \rightarrow 90.32$

$100 - 90.32$

4. Bags of potatoes in a shipment averaged 10 pounds with a standard deviation of 0.5 pounds. The distribution of these weights is approximately normal.

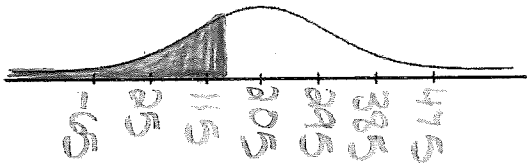
a) What percent of the bags weighed less than 10.25 pounds? 4a._____

b) What percent of the bags weighed more than 10.7 pounds? 4b._____

5. College statistics textbook prices are normally distributed with mean \$205 and standard deviation \$90.

a) What percent of the textbooks cost less than \$150? 5a. 27.09%

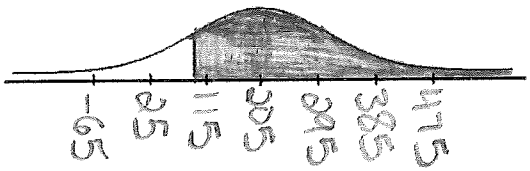
$$\frac{150-205}{90} = -0.611 \rightarrow 27.09\%$$



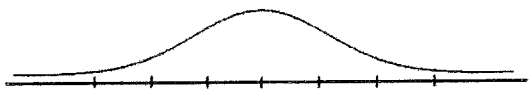
b) What percent of the textbooks cost more than \$100? 5b. 98.81%

$$\frac{100-205}{90} = -2.28 \rightarrow 1.19\%$$

$$100 - 1.19\% = 98.81\%$$



6. Since 1945, the Standard & Poor's 500 Index has had a mean yearly return of 12%, with a standard deviation of 16.5%. The distribution of these returns is approximately normal. In what proportion of years is the market "down" (meaning the return is less than zero)?



6._____

Unit 5 worksheet 4

Name Key

Hour _____

For each part of #1 – 2: label and shade a picture, find the z-score, and use Table B.

1. In 1999, the scores of the more than one million students were approximately normal with mean 1017 and standard deviation 209.

(a) What percent of all students had scores between 900 and 1100? 1a. _____

(b) What percent of all students had scores between 720 and 820? 1b. _____

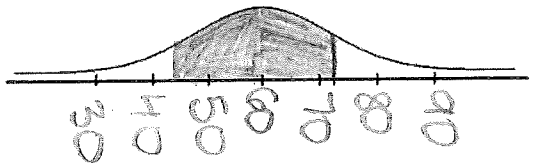
2. The length of time needed to complete a certain test is normally distributed with mean 60 minutes and standard deviation 10 minutes.

(a) What percent take between 45 and 73 minutes to complete the test? 2a. 83.64%

$z = \frac{45-60}{10} = -1.5 \rightarrow 6.68\%$

$z = \frac{73-60}{10} = 1.3 \rightarrow 90.32\%$

$90.32\% - 6.68\% = 83.64\%$

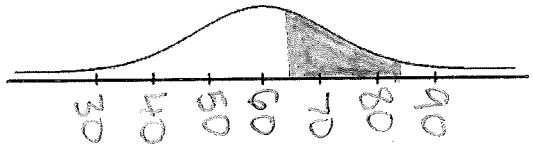


(b) What percent take between 65 and 85 minutes to complete the test? 2b. 30.23%

$z = \frac{65-60}{10} = 0.5 \rightarrow 69.15\%$

$z = \frac{85-60}{10} = 2.5 \rightarrow 99.38\%$

$99.38\% - 69.15\% = 30.23\%$

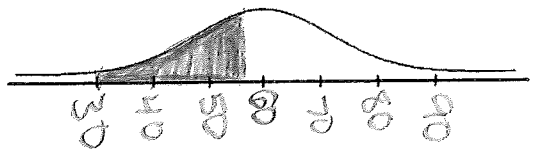


(c) What percent take between 30 and 58 minutes to complete the test? 2c. 41.94%

$\frac{30-60}{10} = -3 \rightarrow 0.13\%$

$\frac{58-60}{10} = -0.2 \rightarrow 42.07\%$

$42.07 - 0.13 = 41.94\%$



For each part of #3 – 5: use Table B, find the z-score, then find solution.

3. The Graduate Record Examinations are widely used to help predict the performance of applicants to graduate schools. The psychology department finds that the scores of its applicants on the GRE are approximately normal with mean 544 and standard deviation 103.

(a) What score would a student need to score in the 92nd percentile? 3a. _____

(b) What score would a student need to score in the 40th percentile? 3b. _____

(c) What score would a student need to score better than 77% of those taking the test? 3c. _____

4. The average yearly snowfall in Lincoln is normally distributed with a mean of 55 inches and standard deviation of 3.5 inches.

(a) What amount of snowfall would qualify for the 95th percentile of years on record? 4a. 60.775

95th percentile

Z-Score = 1.65

$\frac{x-55}{3.5} = 1.65$ → $x - 55 = 5.775$

$x = 60.775$

(b) What amount of snowfall would qualify for the 32nd percentile of years on record? 4b. 53.25

30th percentile

Z-Score = -0.5

$\frac{x-55}{3.5} = -0.5$ → $x - 55 = -1.75$

$x = 53.25$

5. The quartiles of any distribution are the 25th and 75th percentiles. How many standard deviations from the mean are the quartiles of any normal distribution? 25% 5. 0.67

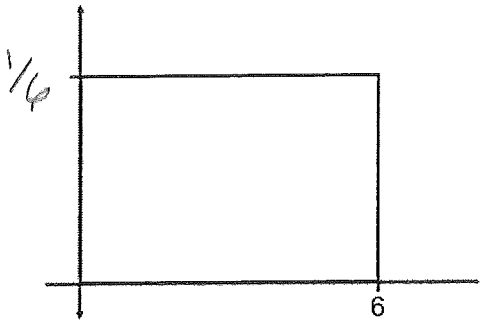
Table → 0.67 standard deviations

Unit 5 worksheet 4B

Name Key

Hour_____

1. A single six-sided die is rolled many times and the data was recorded. The density curve pictured represents the data collected.



a. Find the vertical scale. (height)

$A = B \cdot h$

$1 = 6 \cdot h$

$h = 1/6$

b. What percent of the data is above 3.5?

$A = \frac{1}{6}(2.5) = 0.4167 \approx 41.67\%$

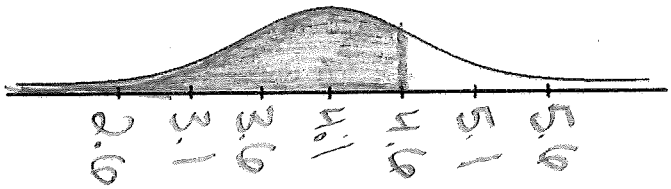
c. What percent of the data falls between 0.5 and 2.7?

$A = \frac{1}{6}(2.2) = 0.3667 \approx 36.67\%$

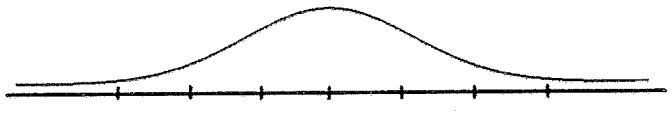
2. The Minnesota Twins gave up an average of 4.1 runs this past season with a standard deviation of 0.5.

a. Using the 68-95-99.7 rule, find the percent of games the Minnesota Twins would allow less than 4.6 runs per game?

$50 + 34 = 84\%$



b. Using the 68-95-99.7 rule, find the percent of games the Minnesota Twins would allow between 2.6 and 5.1 runs per game?



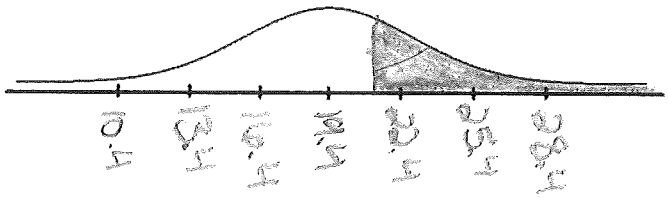
3. The Minnesota Vikings gave up an average of 19.4 points with a standard deviation of 3.

a. What percent of games did the Vikings give up 21 points or more?

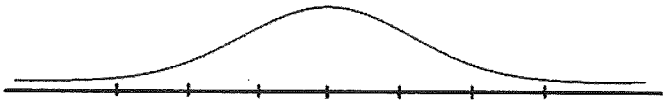
$Z = \frac{21 - 19.4}{3} = 0.53$

Table → 70.19

$100 - 70.19 = 20.81\%$



b. What percent of games did the Vikings give up between 14 and 26 points?



95.03%

c. How many points did the Vikings give up if their standard score was 1.2?

$\frac{X - 19.4}{3} = 1.2$ $X - 19.4 = 3.6$

$X = 23$

d. How many points would the Vikings need to give up to be in the 85th percentile?

70% → Z-Score = 0.53

$x = 20.96$

4. The overall mean for the NFL was 13.2 points allowed with a standard deviation of 3.2. The Vikings allowed an average of 19.4 points per game.

The overall mean for MLB was 2.3 allowed runs with a standard deviation of 0.4. The Twins allowed an average of 4.1 runs per game.

Use z-scores to decide which team had the better defense.