

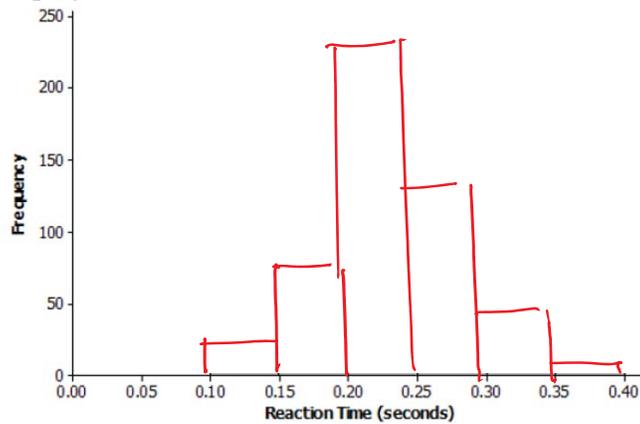
Algebra 2 Trig Honors Stats Day 4 Homework

Key

- 1) The reaction times of 490 people were measured. The results are shown in the frequency distribution table below.

Reaction Time (seconds)	0.1 to < 0.15	0.15 to < 0.2	0.2 to < 0.25	0.25 to < 0.3	0.3 to < 0.35	0.35 to < 0.4
Frequency	9	82	220	138	37	4

- a) Construct a histogram that displays the results.



- b) Looking at the histogram do you think a normal distribution would be an appropriate model for this distribution?

Yes

- c) The mean of the reaction times for these 490 people is 0.2377, and the standard deviation of the reaction times is 0.0457. For a normal distribution with this mean and standard deviation, what is the probability that a randomly selected reaction time is at least 0.25?

$$Z = \frac{x - \mu}{\sigma}$$

$$\mu = .2377 \quad \sigma = .0457$$

$$Z = \frac{.25 - .2377}{.0457} \quad Z = .269 \quad 1 - .6026 = .3974$$

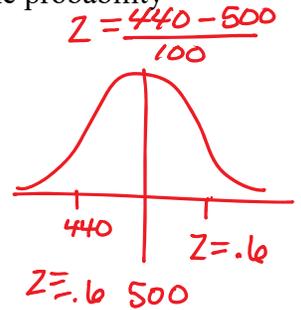
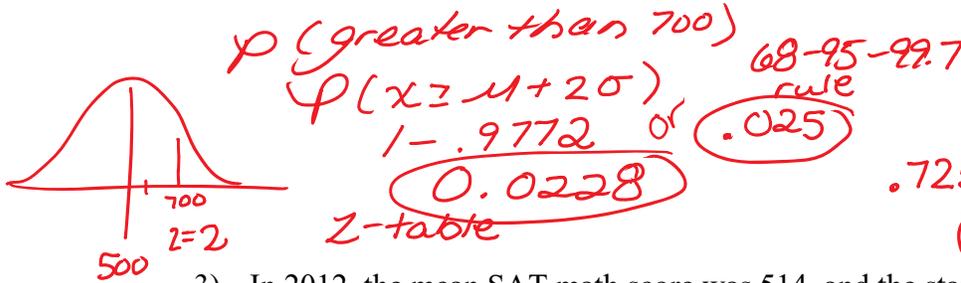
- d) The actual proportion of these 490 people who had a reaction time that was at least 0.25 is 0.365 (this can be calculated from the frequency distribution). How does this compare to the probability that you calculated in part c? Does this confirm that the normal distribution is an appropriate model for the reaction time distribution?

.365 is reasonably close
normal model is appropriate

- 2) SAT scores were originally scaled so that the scores for each section were approximately normally distributed with a mean of 500 and a standard deviation of 100. Assuming that this scaling still applies, use a table of standard normal curve areas to find the probability that a randomly selected SAT student scores:

a) More than 700

b) Between 440 and 560

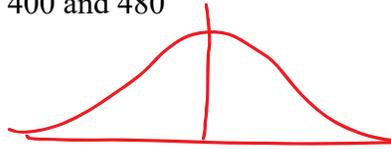


- 3) In 2012, the mean SAT math score was 514, and the standard deviation was 117. For the purposes of this question, assume the scores were normally distributed. Find the probability that a randomly selected SAT math student in 2012 scored:

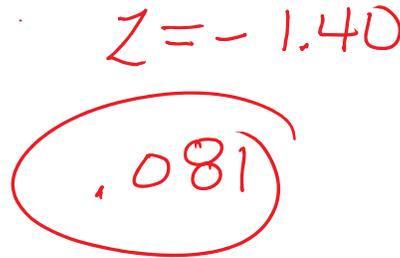
a) Between 400 and 480

b) Less than 350

$\mu = 514$
 $\sigma = 117$



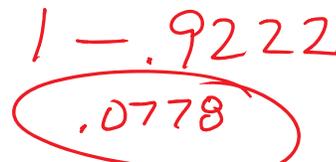
$z = \frac{x - \mu}{\sigma}$



- 4) Use a z-table to find the following.

a) The area to the left of $z = 1.88$

b) The area to the right of $z = 1.42$



c) The area to the left of $z = -0.39$

d) The area to the right of $z = -0.46$



e) The area between $z = -1.22$ and $z = -0.5$

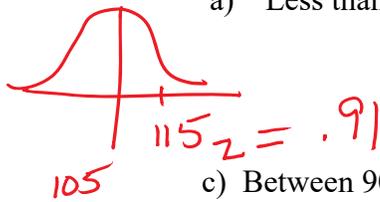
$.3085 - .1112$



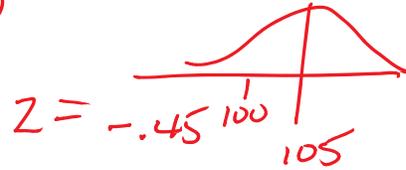
5) Suppose that high school baseball games are approximately normally distributed with mean 105 minutes and standard deviation 11 minutes. Use a z-table to find the probability a randomly selected high school game lasts :

a) Less than 115 minutes

b) More than 100 minutes



$.8186$



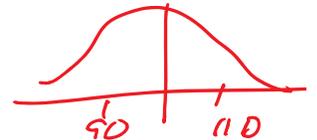
$1 - .3264$

$.6736$

c) Between 90 and 110 minutes

$.6736 - .0869$

$.5867$



d) Suppose the duration of high school softball games are approximately normally distributed with a mean of 95 minutes and a standard deviation of 11 minutes. Is it more likely that a high school baseball game will last between 100 and 110 minutes or that a high school softball game will last between 100 and 110 minutes?

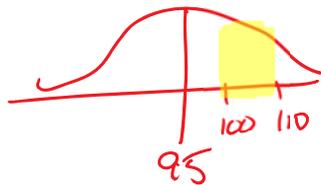
$z = -1.36$

$z = .45$

Baseball



Softball

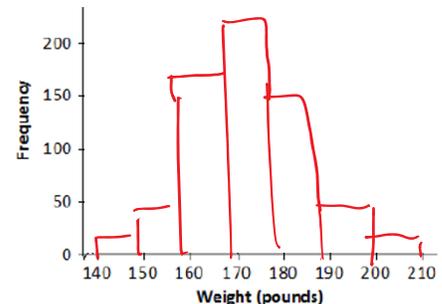


$baseball$

6) A farmer has 625 female adult sheep. The sheep have recently been weighed, and the results are shown in the table below.

Weight (pounds)	140 to < 150	150 to < 160	160 to < 170	170 to < 180	180 to < 190	190 to < 200	200 to < 210
Frequency	8	36	173	221	149	33	5

a) Construct a histogram that displays these results.



b) Looking at the histogram, do you think a normal distribution would be an appropriate model for this distribution?

yes

c) The weights of the 625 sheep have mean 174.21 pounds and standard deviation 10.11 pounds. For a normal distribution with this mean and standard deviation, what is the probability that a randomly selected sheep has a weight of at least 190 pounds?

$\mu = 174.21$

$\sigma = 10.11$

$.0594$

$$z = \frac{190 - 174.21}{10.11}$$

$z = 1.56$

$1 - .9406$

$$\mu = 45 \quad \sigma = 5$$

7) A battery company manufactures batteries having life spans that are normally distributed, with a mean of 45 months and a standard deviation of 5 months.

a) What is the z-score for a battery that has a life span of 53 months? $z = \frac{53-45}{5}$

b) How many months is the battery life span of a battery with a z-score of -1.4?

$$-1.4 = \frac{x-45}{5}$$

c) The longest 14.5% of battery life spans last how many months?

$$z = \frac{x-\mu}{\sigma} \quad 1.06 = \frac{x-45}{5} \quad 50.3 \text{ months}$$

$$1-14.5 = 85.5 \\ z = 1.06$$

8) Find the standard deviation for each set of data. Use the standard deviation to compare the data sets. What can be said about the speeds of birds and cats?

Fastest recorded speeds of various large wild cats in miles per hour

15 30 30 30 30 35 40 50 70

$$\sigma = 14.6$$

Fastest recorded speeds of various birds in flight

25 25 25 31 37 50 53 56 65 95 106 217

$$\sigma = 52.3$$

bird speeds
more spread

9) A set of data has a normal distribution with a mean of 29 and a standard deviation of 4. Find the percent of data within each interval.

a) from 25 to 33

$$68\%$$

b) from 21 to 25

$$13.5\%$$

c) greater than 29

$$50\%$$

d) less than 21

$$2.5\%$$

10) A data set has a mean 30 and a standard deviation of 3. Find the z-score of the value 38.

$$z = 2.67$$

11) A set of data is normally distributed with a mean of 44 and a standard deviation of 3.2. Which statements are **NOT** true?

I 68% of the values are between 37.6 and 50.4

II 13.5% of the values are less than 40.8

III 5% of the values are lower than 37.6 or higher than 50.4

a) I and II only

b) I and III only

c) II and III only

d) I, II and III