Math 107 Section 4.4 Name: _____

Statistics: The Normal Distribution

1. A group of men were surveyed with the following results.

Height In Inches	Number of Men
$60 \le x < 62$	5
$62 \le x < 64$	15
$64 \le x < 65$	17
$65 \le x < 66$	35
$66 \le x < 68$	50
$68 \le x < 69$	52
$69 \le x < 70$	45
$70 \le x < 71$	51
$71 \le x < 72$	39
$72 \le x < 73$	32
$73 \le x < 74$	30
$75 \le x < 77$	15
$77 \le x < 78$	8
$78 \le x < 80$	4
$82 \le x < 83$	1

a) Draw a histogram of the data.

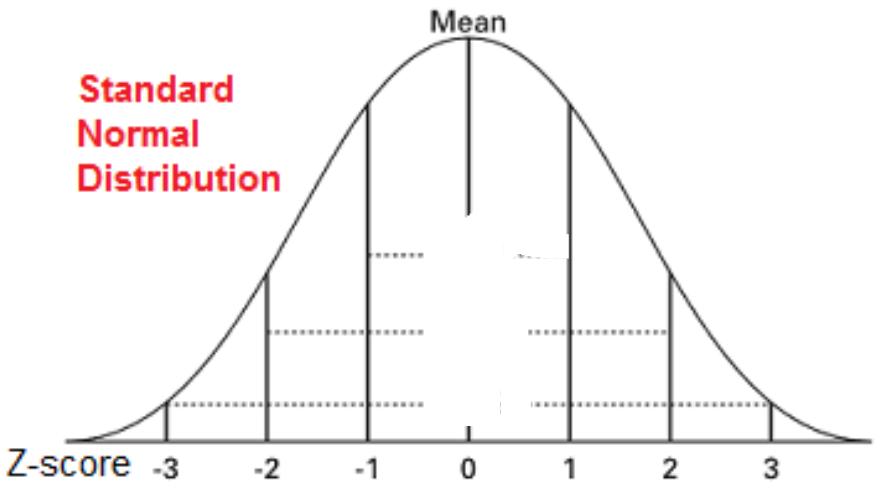
b) Find the mean height of the surveyed men.

c) If the standard deviation is 2 inches, what percent of the data is within 1 standard deviation of the mean? Within two standard deviations of the mean?

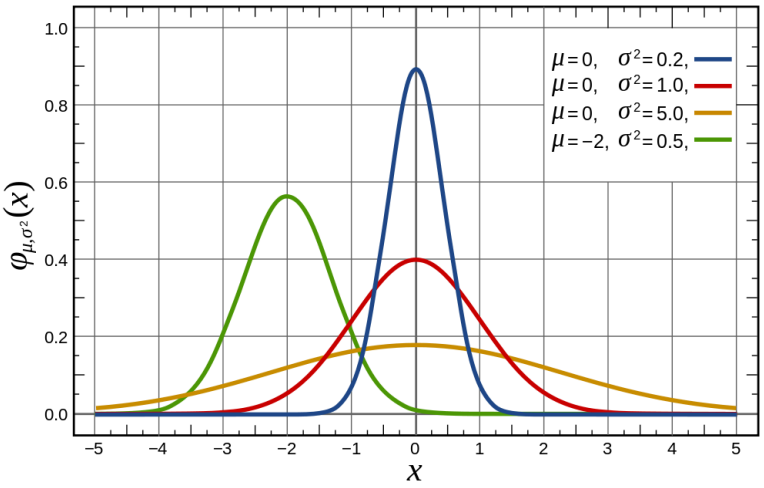
d) What is the probability that a man from the surveyed group is between 70 and 73 inches tall? Over 75 inches tall?

Normal Distribution: We say that a data set is **normally distributed** if the histogram is (relatively) symmetric and the data is clustered near the center of the graph, with frequencies diminishing as distance from the center increases.

The "Standard" Normal Distribution:



Math 107 Section 4.4 Name: _____



Examples: Find the following probabilities from your z-score tables. Make sure to draw a normal curve and shade the area that each is finding.

a) $p(z > 0)$

b) $p(z > 2.5)$

c) $p(z > 0.345)$

d) $p(z = 3)$

e) $p(z < 1.23)$

f) $p(0.5 < z < 0.8)$

g) $p(z < -1.33)$

h) $p(-0.5 < z < 0.7)$

Math 107 Section 4.4 Name: _____

CHALLENGERS!

2. The weights of mice in a lab study are normally distributed with a mean of 6.5 oz and a standard deviation of 1.25 oz. What is the probability that a mouse weighs more than 7 oz?

3. Student GPA's at a certain university are approximately normally distributed with mean 2.4 and standard deviation .8. Find the probability that a student selected has a GPA between 1.9 and 2.5.

Math 107 Section 4.4 Name: _____

4. A machine fills bottles with pop. The volume dispensed is normally distributed with mean 20.0 ounces and standard deviation .2 ounces.

a) If the machine dispenses more than 20.39 ounces, the bottle will break. What is the probability that a bottle will break?

b) If the machine dispenses less than 19.55 ounces, it can not be sold (customers will whine). What is the probability that a bottle has too little volume to be sold?

c) What percent of the bottles filled by this machine are sold?

5. Scores on a certain exam are normally distributed with mean 78 and standard deviation 6. If students who score in the top 10% get an A, what is the minimum score needed for an A?