

February 23, 2011
It is E370 Time!!!

Announcements

- ✓ Answers to the lab exam have been posted.
- ✓ Graders have promised to have lab exam scores posted today.
- ✓ A "Lab Exam Re-evaluate Request Form" has been posted. If you think that an answer you submitted has been incorrectly graded, you will use this form to request that it be looked at again.
- ✓ Your Team Project Proposal is due in lab this week.
- ✓ There is a grade freeze Saturday at 12:00 noon. All scores through the first exam on Saturday, February 12 will be frozen.

A question to get you thinking: In Copper Harbor, Michigan, daily snowfall varies uniformly from 0 to 15 inches. Citizens of the city have agreed that if snowfall is less than 2.5 inches, the roads do not need to be plowed.

- ✓ How likely it is that the plowing crew will have a day off?

- ✓ What percent of daily snowfalls are within one standard deviation of the mean?

- What will we do today?
 - ✓ Practice calculating uniform probabilities.
 - ✓ Discuss what it means to be 'normal.'
 - ✓ Practice calculating expected values of linear transformations.
 - ✓ Transform any normal distribution.
 - ✓ Consider characteristics of the normal and how we would use them to test a distribution.
 - ✓ Consider the relationship between the normal and the standard normal.
 - ✓ See what the standard normal can tell us.
 - ✓ Practice using the standard normal.

- The normal American male will spend 2,965 hours shaving during his lifetime.
 - ✓ What does this mean?

 - ✓ What does it mean to be 'normal'?

 - ✓ Describe in words what the shape of the normal distribution is saying about the observations that make it up.



- List the important characteristics of the Normal distribution. Based on your list, how would you "test" a distribution to see if it is Normal?

Some Notation

- ✓ The Normal is a two parameter distribution, like the Binomial.
- ✓ It is completely defined by the parameters μ and σ
- ✓ We will represent it with this notation:

$$X \sim N(\mu, \sigma)$$

- If $X \sim N(\mu_x, \sigma_x)$, how is

$$H \equiv \frac{X - \mu_x}{\sigma_x} \quad \text{distributed?}$$

- What is the expected value of H ?
- What is the standard deviation of H ?
- What is the shape of the distribution of H ?

□ The "Standard"

The historically most important member of the normal family is

$$X=Z\sim N(0,1)$$

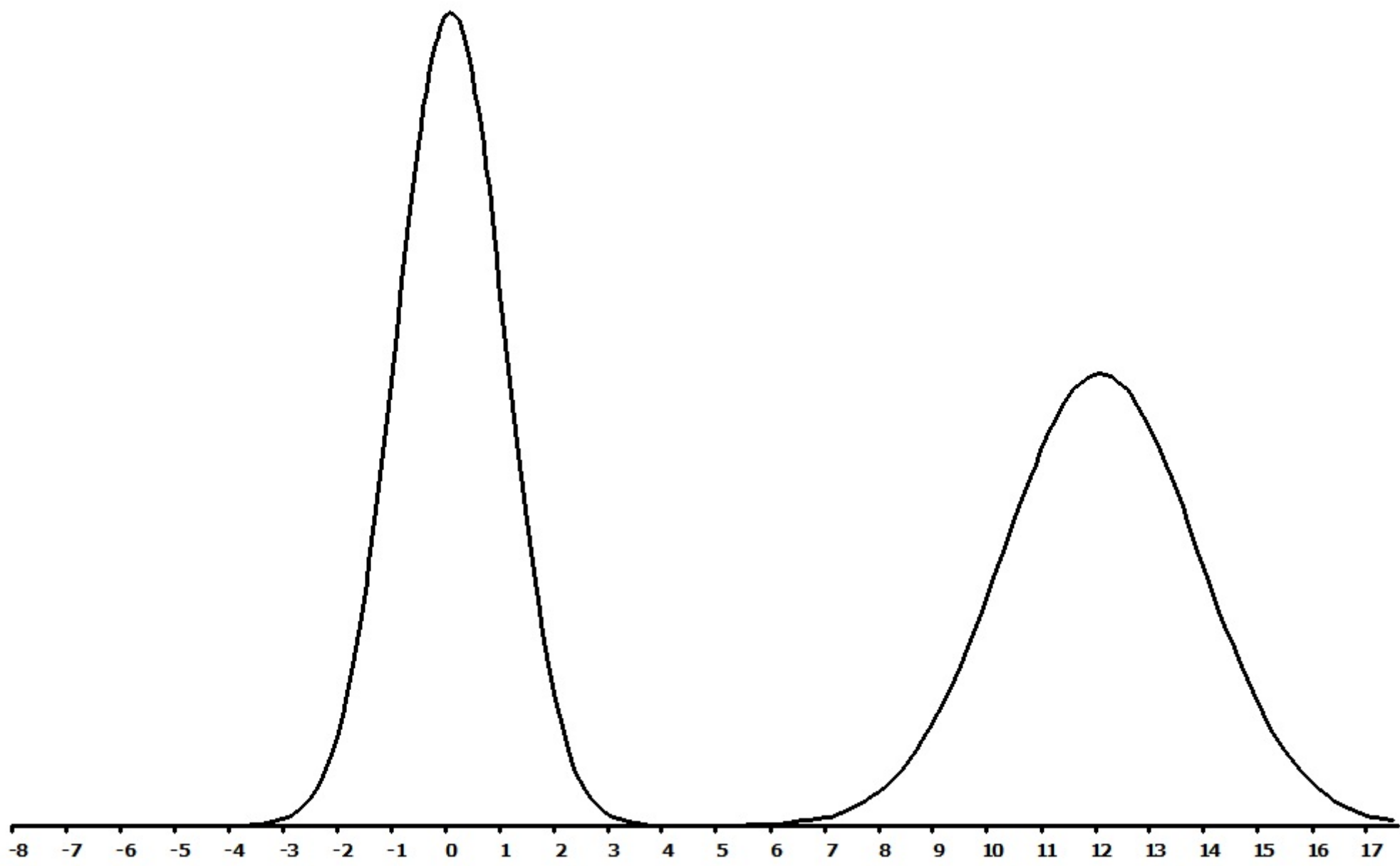
The Standard Normal or
the Z Distribution

Any normal can be transformed into the standard normal using the transformation formula:

$$Z_i = \frac{X_i - \mu}{\sigma}$$

- You have purchased a Miniature poodle that is 9 inches in height for \$350. Which is more unusual, the poodle's height or her price?

Variable	Mean	St. Dev.
Height	12"	1.8"
Price	\$600	\$125



- ❑ The heights of American women aged 20 to 29 are normally distributed with a mean of 65" and a standard deviation of 3". The weights of American men aged 20 to 29 are normally distributed with a mean of 175 lbs and a standard deviation of 35 lbs.
- ❑ Calculate the Z-score for an American woman in this age group who is 67.76 inches tall.
- ❑ Calculate the Z-score for an American man in this age group who weighs 207.20 lbs.
- ❑ What do these two Z-scores demonstrate?
- ❑ How are they interpreted?
- ❑ Which is more likely, an American woman who is 67.76 or more inches tall, or an American man who weighs 207.20 or more pounds?