

November 2, 2009
It is E370 Time!!!

- ☐ Announcements**

- ☐ Today's Goals: You should be able to**
 - ✓ describe the relationship between the Normal and the Standard Normal.**
 - ✓ compare relative extremity for two Normal random variables.**
 - ✓ use Excel to calculate probabilities and values for Normal random variables.**
 - ✓ transform Binomial parameters into Normal parameters.**
 - ✓ correctly use a continuity correction factor.**
 - ✓ estimate Binomial probabilities with the Normal.**

- ☐ Next Time~~A Brave New World**

☐ **Announcements**

- ✓ **Review Session tonight from 7:00 to 9:00 PM.**
- ✓ **Location: BH330**
- ✓ **Review sessions consist of a member of the teaching team answering student questions.**
- ✓ **The Reviewer does not provide a list of questions, summaries or exam hints.**
- ✓ **Remember to Practice! Practice!! Practice!!! on Excel for the exam tomorrow and Friday.**
- ✓ **Lab activities are an excellent source of practice material.**

□ 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

$$H \equiv \frac{X - \mu_X}{\sigma_X}$$

distributed?

□ Derive the expected value of H.

□ Derive 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:

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

Consider this statement:

$$P(a < X < b) = P\left(\frac{a - \mu}{\sigma} < \frac{X - \mu}{\sigma} < \frac{b - \mu}{\sigma}\right) = P\left(\frac{a - \mu}{\sigma} < Z < \frac{b - \mu}{\sigma}\right)$$

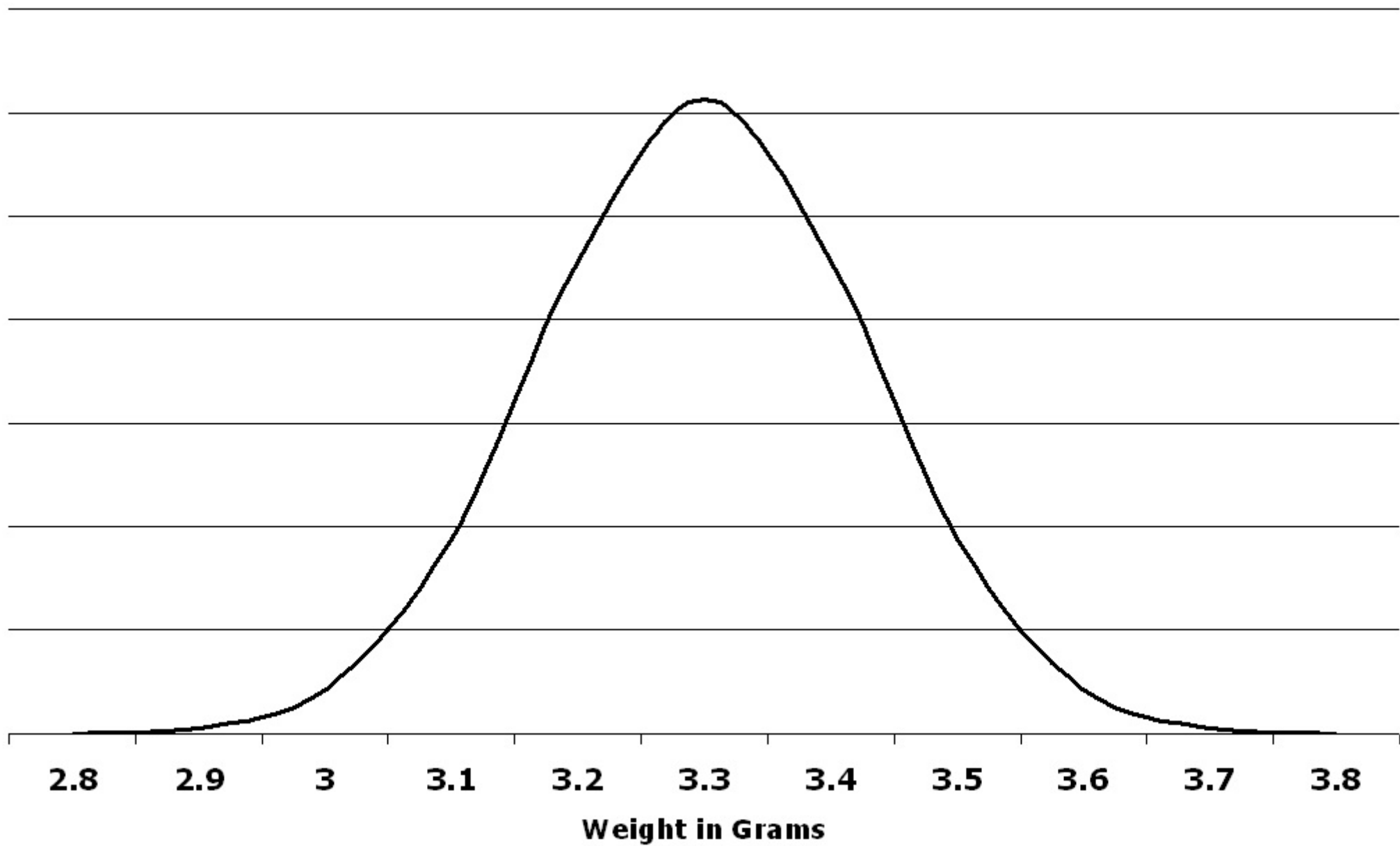
Apply this information:

**X \equiv weight in grams of a miniature Tootsie Roll
 $\sim N(3.30, 0.13)$**

$$\mathbf{a = 3.10}$$

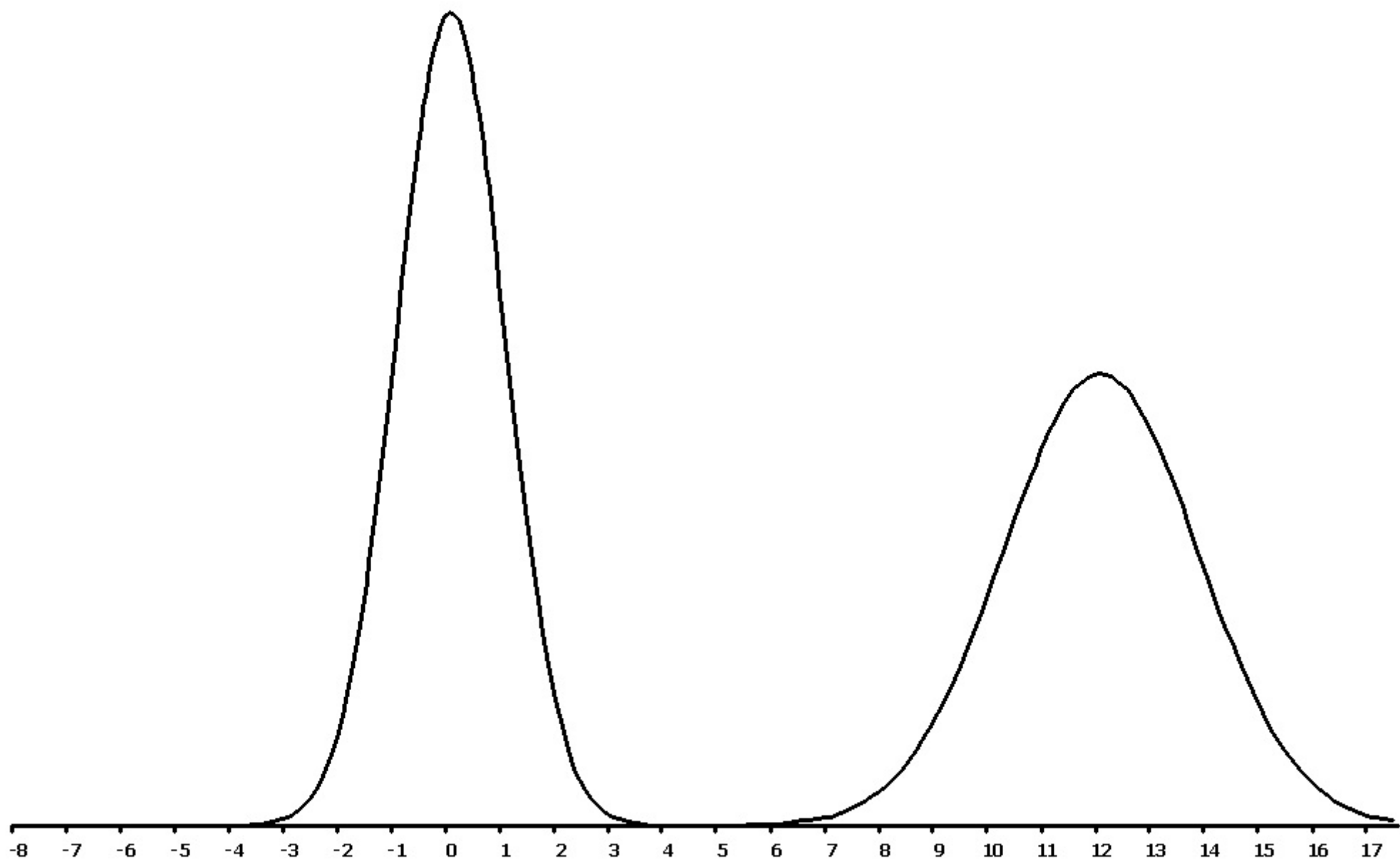
$$\mathbf{b = 3.40}$$

What have you done?



- 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



- ❑ **Male height and weight are two normally distributed random variables.**

Variable	Mean	St. Dev.
Male Height	68"	3"
Male Weight	161 lbs	27 lbs

- ✓ **Bob is 62 inches tall and Bill weighs 201 pounds. Which is more unusual?**
- ✓ **Bob's weight has a z-score of -1.75. How much does Bob weigh?**
- ✓ **Approximately 2.5% of males are taller than Bill. How tall is Bill?**

□ Two New Excel Commands:

✓ =**NORMDIST**(X , μ , σ , 1)

✓ =**NORMINV**(π , μ , σ)

Write Excel commands for the following.		
Variable	Mean	St. Dev.
Male Height	68"	3"
Male Weight	161 lbs	27 lbs
Bob is 62 inches tall and Bill weighs 201 pounds.		

- ✓ **What is Bob's percentile?**
- ✓ **How likely is it that a male will weigh more than Bill?**
- ✓ **Jorge's percentile is 37. How tall is Jorge?**
- ✓ **Seventeen percent of males are heavier than what weight?**