If the word **"normal"** is in the question, you're dealing with a **NORMAL** question. You should also be able to translate the following FOUR items from the question stem: X, μ, σ, and **%.** One will be what you're solving for. Most normal questions boil down the following two types:

*For all **NORMAL** questions, you should draw a picture of the curve to keep from accidentally solving for the wrong side. You can usually use this initial drawing to cancel out half the answer choices on a multiple choice before you even do work. Read carefully for a keyword letting you know which side of the curve is shaded.*

- **DIRECT** questions will ask you to find the "probability" or "percent" in a particular region. You'll be able to find X (the cutoff value), μ (the mean) and σ (the standard deviation) given to you in the question stem.
  - **Finding probabilities:** Use the following steps **X → Z → %**
    - **X → Z :** Convert X to a Z-score using the **DIRECT** formula on your formula sheet under **NORMAL.**
    - **Z → % :** Convert Z-scores to probabilities using the normal table (Z scores are on the outside, probabilities are in the middle).
  - **Calculator shortcut:** normal**c**df(lower, upper, mean, sd) *– Can't be used for free response questions since it's slightly different than what we get from the table, but can be used to check work or on multiple choice.*

- **INVERSE** will give you a percent or a percentile in a particular region. One of the following X (the cutoff value), μ (the mean) and σ (the standard deviation) won't be given to you in the question stem and instead, we'll be asked to find it – *students often get caught up looking for a percent and wrongly think that **NUMBER** or **PROPORTION** questions are **INVERSE NORMAL** questions, remember, you need the word "normal" before you even consider an inverse question!*
  - **Finding values:** Use the following steps **% → Z → X** (or **μ** or **σ**)
    - **% → Z :** Convert % to a Z-score using **inv**Norm(left %) in your calculator
    - **Z → X :** Convert Z-scores to desired values by plugging all the given information and your Z-score into the **INVERSE** formula on your formula sheet.
  - **Calculator shortcut: inv**Norm(left percent, mean, sd) **–** *Can't be used for free response questions since it's slightly different than what we get from the table, but can be used to check work or on multiple choice.*

If you've been given n (a sample size) and p (a probability or percent), you're dealing with either a **NUMBER** or **PROPORTION** question.

- **NUMBER** questions will either have the word "number" in them or they will ask you the "probability that at least 14 people" since 14 is a **NUMBER**, we know were doing one of the following types of questions:
  - **BINOMIAL –** if np OR nq is less than 10, you're dealing with a **BINOMIAL** question
    - **Distribution:** $X \sim B(n,p)$
    - P(X = k) = binom**p**df(n,p,k)
    - P(X ≤ k) = binom**c**df(n,p,k) **-** *For binomial questions, write out a list of all possible outcomes: **0, 1, 2 … n** and circle what portion you're being asked for - this will keep you from using binomcdf incorrectly.*
  - **NORMAL APPROXIMATION TO THE BINOMIAL –** if np AND nq ≥ 10, then you should be using the **NORMAL APPROX** instead
    - **Distribution:** $X \sim AN(np, \sqrt{npq})$
    - **Finding probabilities:** First calculate the mean and standard deviation from above, then draw your curve and treat like a **DIRECT NORMAL** question.

- **PROPORTION** questions will either have the word "proportion" in them or they will ask you the "probability that at least 14% of people" since 14% is a percent which we can write as a **PROPORTION**, we know were doing the following:
  - **Distribution:** $\hat{p} \sim AN\left(p, \sqrt{\frac{pq}{n}}\right)$
  - **Finding probabilities:** First calculate the mean and standard deviation from above, then draw your curve and treat like a **DIRECT NORMAL** question.