I. What type of sample statistic are you being asked about?

	Proportion or Percentage (which is a proportion*100)	Mean or Average
Theoretical range of values	0 to 1.0 or 0% to 100%	$-\infty \leftrightarrow +\infty$
Expected Value or Mean	$\mu_{\hat{p}} = p$	$\mu_{\bar{y}} = \mu$
Standard Deviation of the sampling distribution	$\sigma_{\hat{p}} = \sqrt{\dfrac{p(1-p)}{n}}$ see page 337 or 340	$\sigma_{\bar{y}} = \dfrac{\sigma}{\sqrt{n}}$ see page 345
Notes	You want to use the normal distribution to represent the sampling distribution to help you figure out chances (otherwise you are required to use something like the probability formulas in Chapter 14 & 15). The sampling distribution is approximately normal when n is large. Large is defined as np > 10 and n(1-p) > 10	Read about the CLT on pages 343-345. (1) If the population is normal then the sample means y-bar will be normal (2) if the population is not normal the sample means will still be normal if n is large and sigma is known. N is large is usually > 50 (p.435)

II. How are you being asked to apply this statistic?

1

	Proportion or Percentage (which is a proportion*100)	Mean or Average
Chapter 18 calculating chances (e.g. "what is the chance?)	Find a Z score then the area from Table Z using: $Z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}}$ (see page 341)	Find a Z score then the area from Table Z using: $Z = \dfrac{\bar{y} - \mu}{\sigma / \sqrt{n}}$ (see page 346)
Chapter 19 calculating confidence intervals (p. 358)	$\hat{p} \pm Z^* * (\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$ find Z* from the last row of table t or derive it from Table Z	Not discussed in Chapter 19, but 23 implies that if sigma is known then $\bar{y} \pm Z^* * (\dfrac{\sigma}{\sqrt{n}})$ find Z* from the last row of table t (level of confidence) or derive it from Table Z.
Chapter 20 (one sided) Hypothesis Testing - use Z test	$Z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}}$ look up the area more extreme than Z to find the p-value. (pp. 376 -378)	Not discussed in Chapter 19, but 23 implies that if sigma is known then $Z = \dfrac{\bar{y} - \mu}{\sigma / \sqrt{n}}$ look up the area more extreme than Z from the Z table to find the p-value.
Chapter 23 t confidence and t (one-sided) hypothesis test	Not done for proportions	$\bar{y} \pm t^*_{n-1} * (\dfrac{s}{\sqrt{n}})$ where s is the sample standard deviation and sigma (σ) is unknown. Use the last row of table t (has level of confidence) in combination with the degrees of freedom (d.f.) n-1 (see pages 435-436) For hypothesis testing $t = \dfrac{\bar{y} - \mu}{s / \sqrt{n}}$ where s is the sample standard deviation and sigma (σ) is unknown. Look up an approximate p-value from the t table (pp. 439-440)

III. Some math to help you see the similarities and differences

<table>
<tr><th></th><th>Proportion or
Percentage (which is a proportion*100)</th><th>Mean or Average</th></tr>
<tr><td>Theoretical range of values for its outcomes</td><td>0 to 1.0 or 0% to 100%</td><td>$-\infty \leftrightarrow +\infty$</td></tr>
<tr><td>Originating Distribution</td><td>A Binomial (0,1) or B(n,p)</td><td>Nearly any non-binomial</td></tr>
<tr><td>Deriving the Expected Value or the mean of the population μ</td><td>$\mu_{\hat{p}} = p$
<table><tr><td>outcome</td><td>1</td><td>0</td></tr><tr><td>probability</td><td>p</td><td>(1-p)</td></tr></table>
(1*p) +(0*(1-p)) = p = μ</td><td>$\mu_{\bar{x}} = \mu$
<table><tr><td>outcome</td><td>x_1</td><td>…</td><td>x_n</td></tr><tr><td>probability</td><td>p_1</td><td>…</td><td>pn</td></tr></table>
$\sum_{i=1}^{n} x_i p_i = \mu$</td></tr>
<tr><td>Deriving the Population Standard Deviation σ</td><td>$\sqrt{\sum_{i=1}^{n}(x_i-\mu)^2 p_i}$ so this could be rewritten as
$\sqrt{(1-p)^2(p)+(0-p)^2(1-p)}$
for the binomial and this will ultimately yield:
$\sqrt{(p)(1-p)}$</td><td>$\sqrt{\sum_{i=1}^{n}(x_i-\mu)^2 p_i}$ gives us σ</td></tr>
<tr><td>Standard Deviation of the sample distribution $\frac{\sigma}{\sqrt{n}}$</td><td>$\sqrt{(p)(1-p)}$ divided by $\sqrt{n}$ will give us
$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$</td><td>σ divided by $\sqrt{n}$ will give us
$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$</td></tr>
</table>