


STATISTICS 1040

Solutions Quiz 8

1. About 8 percent of men in the U.S. have some form of color-blindness. Assuming that color-blindness is assigned randomly to men at birth, estimate the chance that of 400 male births in the U.S., fewer than 6 percent will be color-blind.

$\boxed{8\% \text{ is } .08, 92\% \text{ is } .92}$  → Draw 400 & consider the % is drawn.  
 EV for % = 8%  
 Box SD =  $\sqrt{(.08)(.92)} = .27$  SE for % =  $\frac{\text{Box SD} \times \sqrt{400}}{400} \times 100\%$   
 $= \frac{(.27)(20)}{4} = 1.36$   
 $\frac{6 - 8}{1.36} = -1.47$    $A(-1.47) = 8\%$  7%

2. A simple random sample of 400 people (over the age of 18) is taken from Utah. Of those sampled, 256 favor fluoridation of the drinking water. Find a 95% confidence interval for the percentage of people in the state who favor fluoridation of the drinking water.

$\boxed{? \text{ is } .?, ? \text{ is } .?}$  → Draw 400 & consider the % is drawn.  
 EV for % is = Box % is.  
 SE for % is =  $\frac{\text{Box SD} \times \sqrt{400}}{400} \times 100\%$   
 $= \frac{\sqrt{\frac{256}{400} \times \frac{144}{400}} \times \sqrt{400}}{400} \times 100\% = \frac{(.48) \times 20}{4} \% = 2.4\%$   
 $64\% \pm 2(2.4\%)$ ,  $64\% \pm 4.8\%$

3. The U.S. Bureau of Labor Statistics regularly collects information on the labor market. From a random sample of 1600 manufacturing workers, the bureau found that workers employed in manufacturing industries earned an average of \$670 per week and the standard deviation for this sample is \$80. Find a 95% confidence interval for the average weekly earnings of all U.S. workers employed in manufacturing industries.

$\boxed{\text{weekly earnings}}$  → Draw 1600 + consider AV of draws.  
 AV draws = Box AV + chance error.  
 $SE = \frac{\text{Box SD} \times \sqrt{1600}}{1600} \approx \frac{80 \times \sqrt{1600}}{1600} = \$2$   
 $\$670 \pm 2 SEs$ , \$670 ± \$4 How about a 90% C.I.:  
 $\$670 \pm (1.65) \$2$   
 $\$670 \pm \$3.30$