Math 121 **Quiz #9 Answers** **Fall 2008**

p. 595: 22. (20 pts)

(a) (12 pts) The formula is

$$\hat{p} \pm z\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}.$$

So we need to know $\hat{p}$, n, and z. According to the problem, $\hat{p} = \frac{20}{280} = 0.0714$ and $n = 280$. For a 90% confidence interval, $\alpha = 0.10$, so $\alpha/2 = 0.05$. Therefore, we find `invNorm(.05)` $= -1.645$. So the 90% confidence interval is

$$0.0714 \pm (1.645)\sqrt{\frac{(0.0714)(0.9286)}{280}} = 0.0714 \pm 0.0253.$$

(b) (6 pts) For a 95% confidence interval, all we need to do is to change the value of z. α is now 0.05, so $\alpha/2$ is 0.025. So $z =$ `invNorm(.025)` $= -1.960$. The 95% confidence interval is

$$0.0714 \pm (1.960)\sqrt{\frac{(0.0714)(0.9286)}{280}} = 0.0714 \pm 0.0.0302.$$

(c) (2 pts) The interval in part (b) is wider. We would expect that because it has a higher confidence level. Wider intervals are more likely to contain p.