

## Answers to Quiz 6

1. Assume that 15% of subjects treated with Tamiflu experienced the adverse reaction of nausea (based on clinical trials).

- (a) Find the probability that among 250 randomly selected subjects treated with Tamiflu, exactly 17 of them experienced nausea.

*Let  $x$  be the random variable that describes the number of subjects that experience nausea. Using the normal approximation to Binomial probabilities, we have that the mean of  $x$  is  $\mu = np = 250 * 0.15 = 37.5$  and standard deviation  $\sigma = \sqrt{np(1-p)} = \sqrt{250 * 0.15 * (1 - 0.15)} = 5.6457$  [2 pts]. So*

$$\begin{aligned} P(17) &= P(16.5 \leq x \leq 17.5) [0.5 \text{ pts}] \\ &= P(-3.72 < z < -3.54) = P(z < 3.54) - P(z < -3.72) [0.5 \text{ pts}] \\ &= 0.001 - 0.001 = 0 \end{aligned}$$

*using software the above probability would be 0.00010.*

- (b) Find the probability that among 250 randomly selected subjects treated with Tamiflu, the number who experience nausea is 17 or fewer.

$$\begin{aligned} P(17 \text{ or fewer}) &= P(\leq x \leq 17.5) [2 \text{ pts}] \\ &= P(z < -3.54) = 0.001 [1 \text{ pts}] \end{aligned}$$

2. In a clinical trial of OxyContin, 16 subjects experienced headaches among 227 subjects treated with OxyContin.

- (a) Find a point estimate for the proportion of treated subjects who experience headaches.

*A point estimate for the proportion of treated subjects who experience headaches is the sample proportion of treated subjects who experience headaches, given by  $\hat{p} = 16/227 = 0.0705$ . [3 pts]*

- (b) Find the margin of error,  $E$ , that corresponds to a 95% confidence interval for the proportion of treated subjects who experience headaches.

*Note that for  $\alpha = 0.05$ ,  $z_{\alpha/2} = 1.96$  [1 pts] . So,  $E = z_{\alpha/2} \sqrt{\hat{p}(1 - \hat{p})/n}$  [1pts] =  $1.96 * \sqrt{0.0705(1 - 0.0705)/227} = 0.0333$  [1 pts] .*