

**Quiz 6 for Statistics 213**  
**Probability and Decision Theory - Spring 2000**  
**Material Covered: Sections 8.5 and 8.6 of Workbook and text**  
**For: 14th April**

This is a 15 minute quiz, worth 6% and marked out of 6 points. The total possible points awarded for each question is given in square brackets at the beginning of each question. Anything that can fit on one side of an  $8\frac{1}{2}$  by 11 inch piece of paper may be used as a reference during this quiz. A calculator and appropriate statistical tables may also be used. No other aids are permitted.

1. Suppose  $X$  is a normal random variable with  $\mu = 35$  and  $\sigma = 25$ . Then (circle closest one)

(a) [1]  $P(X < 42) = \mathbf{0.54} / \mathbf{0.55} / \mathbf{0.58} / \mathbf{0.60} / \mathbf{0.61}$

(b) [1]  $P(X > 46) = \mathbf{0.24} / \mathbf{0.25} / \mathbf{0.28} / \mathbf{0.32} / \mathbf{0.33}$

(c) [1]  $P(30 < X < 42) = \mathbf{0.19} / \mathbf{0.22} / \mathbf{0.25} / \mathbf{0.32} / \mathbf{0.37}$

2. It was found in 1979 the brain weights of a certain population of adult chimps follow approximately a normal distribution with mean 270 gm and standard deviation 40 gm.

(a) [1] The fraction of adult chimps with brains weighing between 250 gm and 300 gm is (circle closest one)

(a) 0.383    (b) 0.465    (c) 0.547    (d) 0.651    (e) 0.782

(b) [1] A brain weight of 240 gm, expressed as a percentile, is (circle closest one)

(a) 12th    (b) 23rd    (c) 35th    (d) 41st    (e) 45th

3. [1] A lawyer, who presently represents 14 defendants, estimates she wins 27% of her cases. Assume this problem obeys the conditions of a binomial experiment. The normal approximation to the exact probability of winning 3 trials

**1.**

- (a) [1] **0.61**
- (b) [1] **0.33**
- (bc) [1] **0.19**

**2.**

- (a) [1] (b) 0.465
- (b) [1] (b) 23rd (since  $P(X < 240) \approx 0.23$ )

**3.**  $P(2.5 \leq X \leq 3.5) \approx 0.212$  since  $n = 14$ ,  $p = 0.27$ ,  $\sigma = \sqrt{np(1-p)} \approx 1.67$ ,  $\mu = np = 3.78$