Economics 250 Midterm Test 2: Answer Guide

1. (a) The standard error is 0.045825 so using the normal approximation to the binomial:

$$z = \frac{0.75 - 0.7}{0.045825} = 1.091,$$

From table 1 the probability of a value above this is 0.1379 or 13.79%.

(b) The formula is:

$$0.8 \pm 1.96 \times \sqrt{\frac{0.8(0.2)}{100}} = 0.8 \pm 0.0784 = (0.7216, 0.8784)$$

2. From table 8 the cutoff point for the t distribution with $df = n - 1 = 19$ is 1.729; that leaves 5% in each tail. So the confidence interval is:

$$13 \pm 1.729 \times 6/\sqrt{20} = 13 \pm 2.3196 = (10.68, 15.32)$$

3. (a) The covariance is $\sigma_{12} = 0.5(2)(1) = 1$, so for the portfolio return the mean is:

$$\mu_p = \frac{1}{3}1 + \frac{2}{3}2 = 1.667,$$

and the variance is:

$$\sigma_p^2 = \frac{1}{9}1 + \frac{4}{9}4 + 2\frac{1}{3}\frac{2}{3}(1) = \frac{21}{9} = 2.334$$

(b) The z-statistic is:

$$\frac{1 - 1.667}{1.5277} = -0.4366,$$

so from table 1 the probability is 0.67 or 67%.

4. (a) The conditional variance is 208.33.

(b) The mean is $0.3 \times 55 + 0.7 \times 35 = 41$.

(c) For graduates, the probability of income being above 40 is 0.8. For non-graduates, the probability of income being above 40 is 0.334, using the uniform density. Next, the probability of being a graduate and above 40 is $0.8 \times 0.3 = 0.24$ and the similar joint probability for non-graduates is $0.333 \times 0.7 = 0.2331$. Thus the marginal probability of being above 40 is $0.24 + 0.2331 = 0.4731$. Then the probability of being a graduate conditional on earning above 40 is $0.24/0.4731$ or 0.507: 50.7% (or 51% to the nearest percentage point).