Economics 250 Midterm Test 1: Answer Guide

1. (a) $\overline{x} = 61$ and $\overline{y} = 26$.

(b) First we need the deviations from the mean:

$x - \overline{x}$	$y - \overline{y}$	$(x - \overline{x})^2$	$(y - \overline{y})^2$	$(x - \overline{x})(y - \overline{y})$
-16	-11	256	121	176
17	14	289	196	238
-1	-3	1	9	3

So $s_x^2 = 546/2 = 273$ and $s_x = 16.5227$; $s_y^2 = 326/2 = 163$ and $s_y = 12.7671$; $s_{xy} = 208.5$. Thus:

$$r_{xy} = \frac{208.5}{16.5227 \times 12.7671} = \frac{208.5}{210.946} = 0.988$$

2. (a) We know $P(J \cap T) = 0.05$ and $P(T) = 0.15$ so

$$P(J|T) = \frac{0.05}{0.15} = \frac{1}{3} = 0.33$$

(b)

$$P(T|J) = \frac{P(J \cap T)}{P(J)} = \frac{0.05}{0.7} = 0.0714$$

or 7.14% of newly employed workers received training.

3. (a) The expected value is

$$0.75 \times 100 + 0.25 \times 40 = 85 \text{ dollars.}$$

(b) The expected value of the profit is:

$$0.5 \times 85 - 40 = 2.5 \text{ dollars.}$$

(c) The expected profit is:

$$0.5[100\lambda + 40(1 - \lambda)] - 40 = 30\lambda - 20.$$

4. (a) From the binomial formula or tables the value is 0.0523 or 5.23%.

(b) With $n = 10$ and $P = 0.10$ the probability is $1 - 0.3487 - 0.3874 = 0.2639$ or 26.39%