Eco 500: solution to midterm exam

1. For example $u(C) = 1, u(A) = 2, u(B) = 3, u(D) = 2$.

2. $x(p_1, p_2, w) = (w/p_1 - 1, p_1/p_2)$

3. $e(p_1, p_2, u) = \min(u * p_1, u * p_2, u * p_3/2)$.

4. The information is consistent with WARP. The bungle $(2, 2)$ is revealed to be preferrable to $(5, 0)$ (since $(5, 0)$ is inside the budget set in which $(2, 2)$ was chosen).

5. $x(p_1, p_2, w) = \left(\frac{w}{2(p_1+p_2)}, \frac{w}{2p_2} + \frac{w}{2(p_1+p_2)} \right)$ (use homegenuity to find x_1 and then Warlas' law to find x_2)

6. $R \prec L \prec M$.

7. $\left(\sqrt{10}/3 + \sqrt{8}/3 + \sqrt{6}/3 \right)^2$.

8. b,c,d are correct

9. suppose by contradiction that $u : \{a, b, c, d\} \to \mathbf{R}$ is a utility for these preferences. From $(0.2, 0.2, 0.3, 0.3) \prec (0.2, 0.2, 0.4, 0.2)$ it follows that

$$0.2u(a)+0.2u(b)+0.3u(c)+0.4u(d) < 0.2u(a)+0.2u(b)+0.4u(c)+0.2u(d)$$

which implies that $u(c) > u(d)$. Similarly, from $(0.1, 0.3, 0.5, 0.1) \prec (0.1, 0.3, 0.4, 0.2)$ it follows that $u(c) < u(d)$, a contradiction.

10. The correct answer is a. First, a risk neutral agent will prefer L because the expected amount of money under L is 6 and under R is 5.4. Second, if the agent's utility is given by $u(x) = \min(x, 4)$, which is concave, then the expected utility under L is 3.25 and the expected utility under R is 3.7, so a risk averse agent might prefer R (anoher way to see that a risk averse agent might prefer R is to show that L does not second-order stochasticly dominates R using Grossman-Stieglitz characterization).