GS/ECON 5010 Assignment 3 F2010

due : Wednesday November 10 8:30 am

Do all 5 questions. Each counts 20%.

1. Suppose that there are two states of the world, and that the probability of state #1 is π (with $0 < \pi < 1$). An investor is choosing how to allocate her wealth among three assets.

Asset a pays a net return of 5% in state #1, and 20% in state #2.

Asset b pays a net return of 10% in state #1, and 10% in state #2.

Asset c pays a net return of 0% in state #1, and 40% in state #2.

Investors are not allowed to go short. (That is, they must hold non–negative quantities of each asset.) Which assets might be held in the portfolio of a risk–averse utility maximizer?

Explain briefly.

2. How much would a risk–averse utility maximizer invest in asset c, if her utility–of–wealth function were

$$u(W) = \frac{1}{1-\beta} W^{1-\beta} \qquad \beta > 0$$

and the asset returns are as described in question 1?

3. Is the production function

$$F(x_1, x_2, x_3) = (\sqrt{x_1} + 2\sqrt{x_2} + 3\sqrt{x_3})^3$$

weakly separable? Strongly separable? Explain briefly.

What is the elasticity of substitution for this production function?

4. If a production function $f(x_1, x_2)$ has the equation

$$f(x_1, x_2) = \ln(x_1 + 1) + \ln(x_2 + 1)$$

calculate the marginal product of each input, and the marginal rate of technical substitution.

Does the production function exhibit decreasing, constant, or increasing returns to scale? Explain briefly.

5. Calculate the cost function $C(w_1, w_2, y)$ for the production function from question #4 above.