

Economics 250 Mid-Term Test 1

15 February 2011

Instructions: You may use a hand calculator. Do not hand in the question sheet. Answer all four questions in the answer booklet provided. Show your work. Formulas and tables are provided at the end of the question pages.

1. An economist asks people their annual income y (in thousands of dollars) and their happiness h (on a scale between 0 and 100) and receives these (y, h) answers for 3 people: (32, 50); (64, 85); (75, 51).

(a) Find the sample means \bar{y} and \bar{h} .

(b) What is the sample correlation coefficient between annual income and happiness?

2. Suppose that the probability of a worker receiving the minimum wage is 10%. Of workers who receive the minimum wage, 50% are in low-income households. Of workers who receive more than the minimum wage, 20% are in low-income households.

(a) What is the probability that a random household has low income?

(b) If you are in a low-income household, what is the probability that you receive the minimum wage?

3. Call x the atmospheric carbon dioxide level in parts per million by volume. Call y the change in the earth's surface temperature over the next 50 years, in degrees celsius. Suppose that climate scientists estimate this relationship:

$$y = 0.20 \cdot (x - 390).$$

Suppose x has a mean of 410 and a variance of 18. Find the mean and variance of the change in the temperature.

4. Suppose that countries with fiscal stimulus programs avoid recessions with probability 0.6.

(a) What is the probability that a country with fiscal stimulus does *not* avoid a recession?

(b) If you sample $n = 10$ countries with stimulus programs what is the probability that at least half of them avoid a recession?