PROBLEM SET ONE--ECON 3720

❶ a) Suppose Bland workers have a certain MRP of $300,000 per year, Wild workers have MRP that is equally likely to be anything from -$400,000 to $1million, & workers must be paid $300,000 per year. After 1 year, a firm learns what kind of worker it has hired. Workers not terminated work for 10 years. Determine $E(\pi_{Wild})$ & prob(fire)$_{Wild}$.
   b) With the same information as a), but MRP$_{Wild}$ ranging from -$200,000 to $700,000, find $E(\pi_{Wild})$ & prob(fire)$_{Wild}$.

❷ a) Suppose Able workers have a career MRP of $400,000, Unable workers have a career MRP of $200,000, and α is the fraction of Able workers in the population. What wage would be paid if Able workers could not differentiate themselves from Unable workers?
   b) Assume Able workers can invest in education that does NOT increase their productivity, but costs them $150,000, & would cost Unable workers $210,000. When would Able workers invest in this education?

❸ For one year, you may employ another secretary @ $2,000 per month or rent Voice Processor (voice recognition software) for $1,250 per month. A new secretary requires no training, & Voice Processor requires no training for existing managers. Voice Processor produces 6,000 pages of output per year.
   a) If a new secretary produces 12,000 pages of output per year, should you hire the secretary or rent Voice Processor?
   b) If ½ the secretaries you would hire are as productive as Voice Processor, & ½ are twice as productive, at how many months of observation required to learn productivity will you be indifferent to hiring the secretary or renting Voice Processor, given you can terminate the secretary & rent Voice Processor? Hint: find expected output & wage payments for a secretary for the year.

❹ Suppose r = 6% & you expect to work for 40 years after school. C = the present value of the cost of investing in schooling, the increase in earnings each year from going to school = B. For simplicity, treat going to school as occurring instantaneously, with the benefits beginning in one year.
   a) If B = $12,000 & C = $150,000, what is the net present value of this investment?
   b) With C = $150,000, what value of B just breaks even?

❺ An individual can invest in 2 types of skills at a firm Java (J) & tax (T). There is a 40% probability of leaving this firm after one year & working elsewhere for one more year. The individuals MRP = $.8J + .2T$, & MRP on average elsewhere is $.6J + .4T$. What are the optimal investment levels for J & T when the cost of investment = $\frac{1}{2}(J^2 + T^2)$?

❻ Explain who pays for purely specific human capital investment & why this is so.

❼ Explain who pays for purely general human capital investment & why this is so.