

**Variable Pay (Piece Rates)**

1. A firm wishes to establish a wage

$$w = a + bE,$$

where  $E$  is worker effort and  $a$  and  $b$  are to be chosen by the firm. The worker maximizes utility given by

$$U = w - 2E^2 \quad (\text{which is to say the worker's cost of effort is } 2E^2.)$$

Each unit of effort generates 6 units of output which can be sold for \$2 per unit. Assume the workers' utility must be at least 0 for him to be willing to accept the job.

- a. Calculate the workers choice of effort  $E^*$  and the profit-maximizing values of  $a$  and  $b$ .
- b. Calculate the firm's profit, given this optimal wage schedule.
- c. On the same graph, plot the line that represents the firm's wage offers as a function of effort,  $a^* + b^*E$ , and plot the worker's cost of effort  $C(E)$  as a function of effort.
- d. Calculate the numeric value of workers utility at different effort levels of effort:  $E^*$ ,  $E^*-1$ , and  $E^*+1$ .
- e. Suppose the firm chooses the  $a^*$  you calculated above, but chooses  $b=2$ . What is its profit? (Hint: Draw a picture.)