

Name _____

Economics 320

Problem Set 3

1) A firm uses inputs N and K to produce output where N represents labor and K represents capital. In the short run, capital is fixed at the level $K = 1$ unit. In the following chart, compute the values of the marginal product of labor, MP_N and the marginal revenue product of product labor, MRP_N . The formula for the marginal product of labor that corresponds to the production function is

$$MP_N = K(140 - 10N)$$

Compute MRP_N if the output price is fixed at $P = \$2$ and if the output price is fixed at $P = \$3$. Graph the short run labor demand curves for $P = \$2$ and $P = \$3$ in Figure 1.

N	MP_N	$MRP_N, P = \$2$	$MRP_N, P = \$3$
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

- What is the number of workers demanded when $P = \$2$ and the wage rate is \$20? \$60? \$100? _____
- If labor were free, how many workers would be demanded? _____
- What is the number of workers demanded if the wage rate is \$60 and the output price is \$3? _____.
- What is the lowest wage at which no workers would be demanded if the price is \$2? _____.

- e. What would happen to these labor demand curves if the stock of capital were 2 units? _____ . In this example, are capital and labor complements or substitutes in production?
- f. The production function can be written $Q = 140KN - 5N^2$. At $N=5$, price equals \$2, and assuming wage equals marginal revenue product of labor, what is unit labor cost?

Figure 1



