

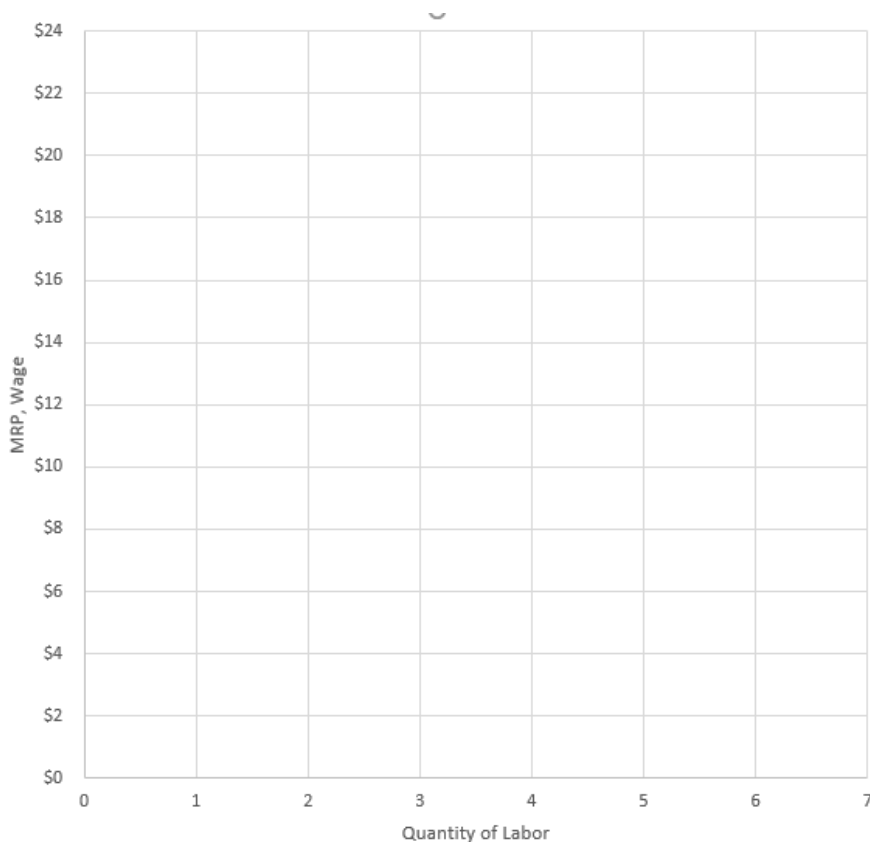
**Practice problems: Labor markets and production costs**

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- You have decided to make some extra money and gain some real-world experience by starting your own business. You have observed that there is a good market for hand-woven doormats made of recycled rope. You can get old rope for free and you can use your home as work space. Your only costs will be for hiring students to work on making mats. The table below shows how many mats you can make with different numbers of workers, how much you can sell the mats for, and how much you have to pay to attract workers.

# of workers (L)	Mats per hour	Marginal product	Price per mat	Marginal Revenue Product (MRP)	Wage per hour (W)
1	8	8	\$2		\$6
2	19		2		6
3	26		2		6
4	30		2		6
5	32		2		6
6	33		2		6

- Fill in all the blanks in the table using your knowledge of factor market relationships.
- Plot** the marginal revenue curve (downward sloping part only) and the wage curve on the same graph.



- According to the table / graph, how many workers should you hire?
- If the wage increased to \$10 per hour, how many workers should you hire? Show this change on your graph.
- In general**, if the price of a mat increased, what would happen to your demand for workers at any given wage rate? (Increase, decrease, remain constant). Why?

**2. Supply and demand in labor markets**

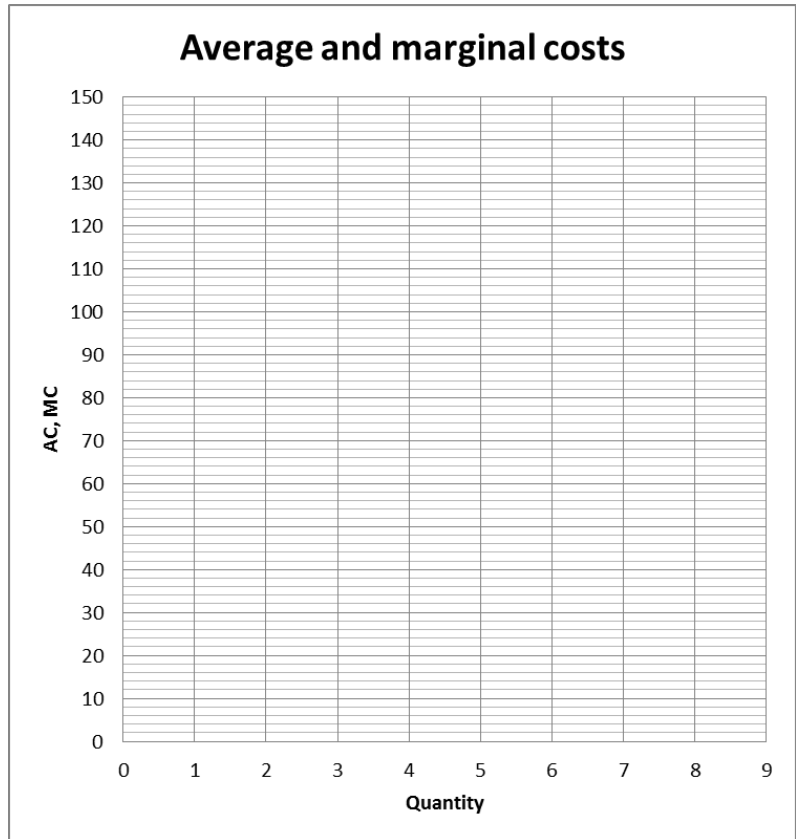
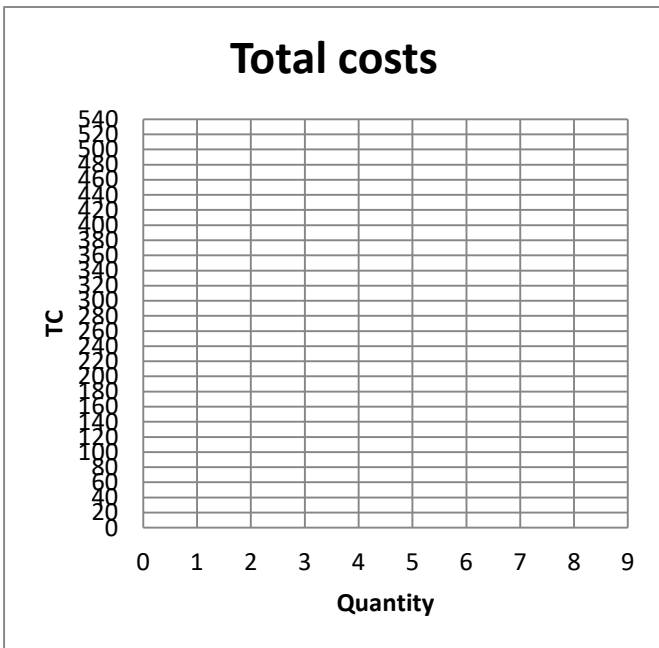
Consider the local labor market for unskilled workers. Assume the current equilibrium wage is \$7.50 per hour and the current level of employment is 3,000 workers. Predict what will happen to wages and employment if local employers determine that unskilled workers have become less productive than they once were. Illustrate your answer with a supply and demand diagram.

**3. Costs in the short run and long run**

Find the TC, TVC, TFC, AVC, AC and MC from the following table:

Units	TFC	TVC	TC	ATC	AVC	MC
0	100	0				
1	100	40				
2	100	60				
3	100	70				
4	100	85				
5	100	130				
6	100	190				
7	100	280				
8	100	400				

- a. Plot the Total fixed cost, Total variable cost and Total cost curves
- b. Plot the ATC, AVC and MC curves



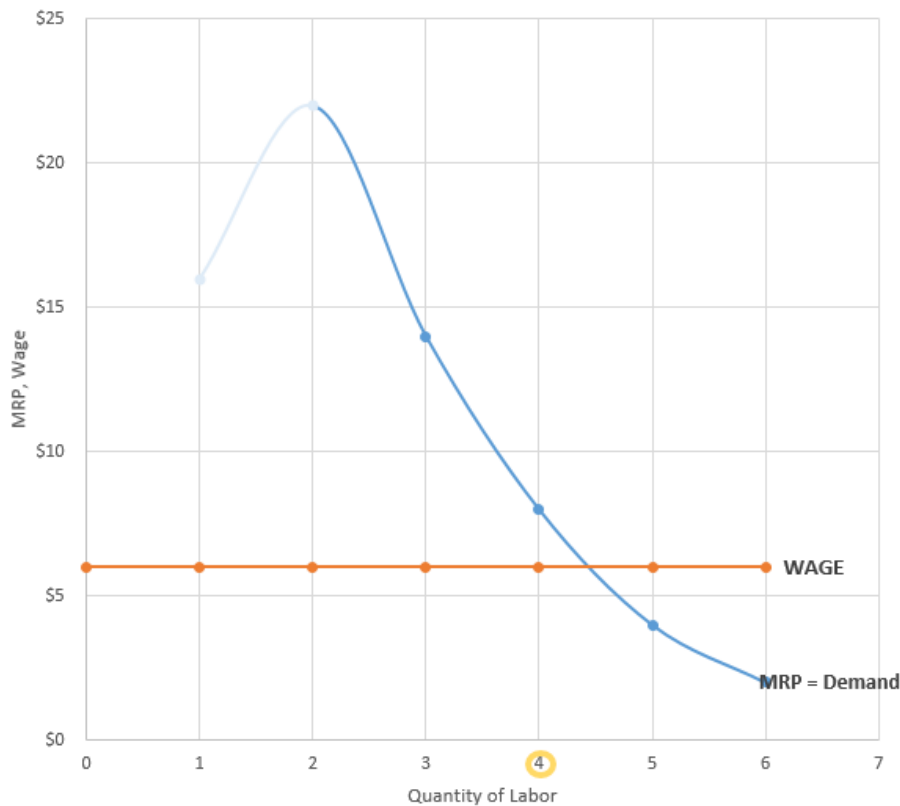
## ANSWERS

### Labor markets

You have decided to make some extra money and gain some real-world experience by starting your own business. You have observed that there is a good market for hand-woven doormats made of recycled rope. You can get old rope for free and you can use your home as work space. Your only costs will be for hiring students to work on making mats. The table below shows how many mats you can make with different numbers of workers, how much you can sell the mats for, and how much you have to pay to attract workers.

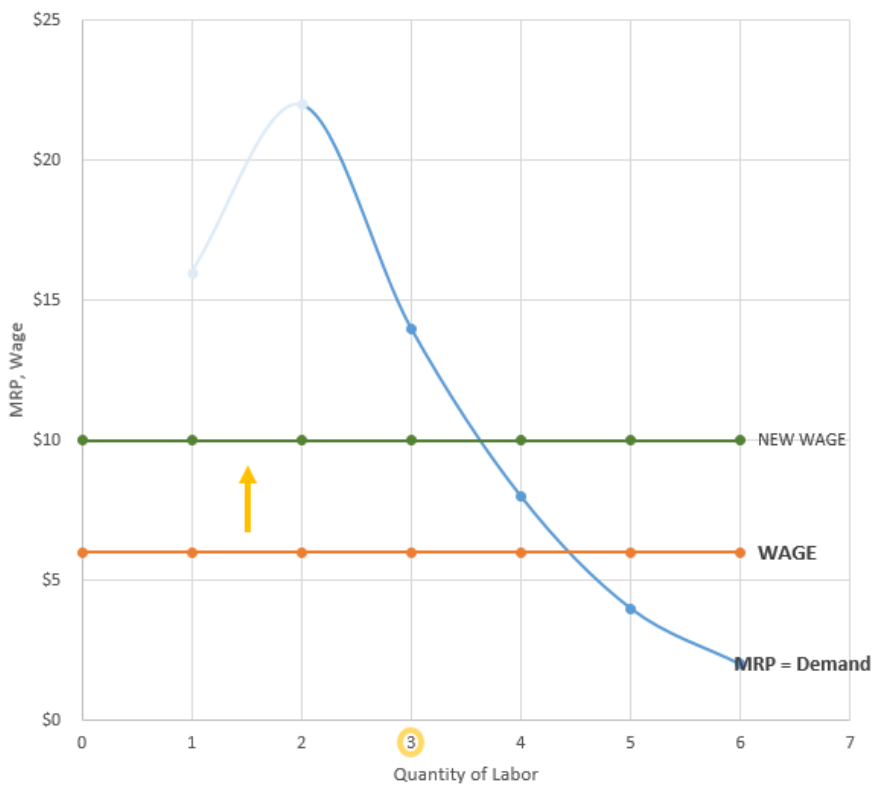
# of workers (L)	Mats per hour	Marginal product	Price per mat	Marginal Revenue Product (MRP)	Wage per hour (W)
1	8	8	\$2	\$16	\$6
2	19	11	2	\$22	6
3	26	7	2	\$14	6
4	30	4	2	\$8	6
5	32	2	2	\$4	6
6	33	1	2	\$2	6

c. Fill in all the blanks in the table using your knowledge of factor market relationships.



d. According to the table / graph, how many workers should you hire?  
Hire 4 workers! WHY? The 5<sup>th</sup> worker creates only \$4 of revenue for you but you must pay her \$6.

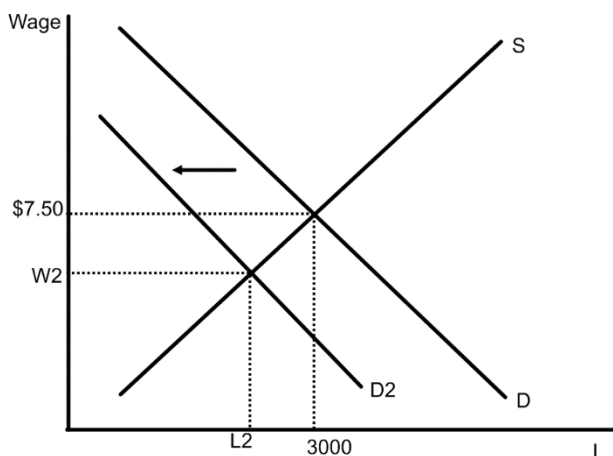
e. If the wage increased to \$10 per hour, how many workers should you hire? Show this change on your graph. At a wage of \$10, you would now only hire 3 workers. (Sketch this as a horizontal line at \$10). Why? At a wage of \$10, you can no longer afford to hire the 4<sup>th</sup> worker, whose output is only worth \$8 to you. So you only hire 3 workers now.



f. **In general**, if the price of a mat increased, what would happen to your demand for workers at any given wage rate? (Increase, decrease, remain constant). Why?

In general, as the price of output increases, a firm wants to hire MORE labor at any given wage. Why? A higher price increases the marginal revenue product of any worker (i.e. the benefit of hiring a worker).

Consider the local labor market for unskilled workers. The current equilibrium wage is \$7.50 per hour and the current level of employment is 3,000 workers. Predict what will happen to wages and employment if local employers determine that unskilled workers have become less productive than they once were. Illustrate your answer with a supply and demand diagram.



Lower productivity = lower marginal product of labor = lower labor demand.  
 Labor demand curve shifts left, causing both employment and wages to fall.

Costs in the short run and long run

Find the TC, TVC, TFC, AVC, AC and MC from the following table:

Units	TFC	TVC	TC	ATC	AVC	MC
0	100	0	100			
1	100	40	140	140	40	40
2	100	60	160	80	30	20
3	100	70	170	56.66667	23.33333	10
4	100	85	185	46.25	21.25	15
5	100	130	230	46	26	45
6	100	190	290	48.33333	31.66667	60
7	100	280	380	54.28571	40	90
8	100	400	500	62.5	50	120

