**Q1**A firm’s product sells for $3 per unit in a highly competitive market. The firm produces output using capital (which it rents at $80 per hour) and labor (which is paid a wage of $20 per hour under a contract for 20 hours of labor services). Complete the following table and use that information to answer the questions that follow.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***K*** | ***L*** | ***Q*** | ***MPK*** | ***APK*** | ***APL*** | ***VMPK*** |
| 0 | 20 | 0 |  |  |  |  |
| 1 | 20 | 50 |  |  |  |  |
| 2 | 20 | 150 |  |  |  |  |
| 3 | 20 | 300 |  |  |  |  |
| 4 | 20 | 400 |  |  |  |  |
| 5 | 20 | 450 |  |  |  |  |
| 6 | 20 | 475 |  |  |  |  |
| 7 | 20 | 475 |  |  |  |  |
| 8 | 20 | 450 |  |  |  |  |
| 9 | 20 | 400 |  |  |  |  |
| 10 | 20 | 300 |  |  |  |  |
| 11 | 20 | 150 |  |  |  |  |

1. Identify the fixed and variable inputs.
2. What are the firm’s fixed costs?
3. What is the variable cost of producing 475 units of output?
4. How many units of variable input should be used to maximize profits?
5. What are the maximum profits this firm can earn?
6. Over what range of the variable input usage do increasing marginal returns exist?
7. Over what range of the variable input usage do decreasing marginal returns exist?
8. Over what range of input usage do negative marginal returns exist?

**Q3** Blue Jet Airlines has an evening flight from Kansas City to Chicago with an average of 80 passengers and a return flight the next afternoon with an average of 50 passengers. The plane makes no other trip. The charge for the plane remaining in Chicago overnight is $1,200 and would be zero in Kansas City. The airline is contemplating eliminating the night flight out of Kansas City and replacing it with a morning flight. The estimated number of passengers is 70 in the morning flight and 50 in the return afternoon flight. The one-way ticket for any flight is $200. The operating cost of the plane for each flight is $11,000. The fixed costs for the plane are $3,000 per day whether it flies or not.

1. Should the airline replace its night flight from Kansas City with a morning flight?
2. Should the airline remain in business?

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