**I.** **MARGINAL PRINCIPLES -- PART II**

Assume the data in the table are experimental results of using different levels of irrigation water per acre of potatoes. Assume you are a potato grower trying to determine how much water to use. Complete the table and answer the questions on the next page. Assume potatoes sell for $7.50 per cwt.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Irrigation Water  (acre-in.) | Potatoes (cwt.) | Average  Physical  Product | Marginal  Physical  Product | Marginal  Value  Product | Marginal Input Cost | | Marginal  Revenue | Marginal Cost | |
| @ $6.00/in. | @ $12.00/in. | @ $6.00/in. | @ $12.00/in. |
| 0 | 165 | XXX | XXX | XXX | XXX | XXX | XXX | XXX | XXX |
| 3 | 199 | 66.33 | 11.33 | 85.00 | 6.00 | 12.00 | 7.50 | 0.53 | 1.06 |
| 6 | 214 | 35.67 | 5.00 | 37.50 | 6.00 | 12.00 | 7.50 | 1.20 | 2.40 |
| 9 | 226 | 25.11 | 4.00 | 30.00 | 6.00 | 12.00 | 7.50 | 1.50 | 3.00 |
| 12 | 233 | 19.42 | 2.33 | 17.50 | 6.00 | 12.00 | 7.50 | 2.57 | 5.14 |
| 15 | 238 | 15.87 | 1.67 | 12.50 | 6.00 | 12.00 | 7.50 | 3.60 | 7.20 |
| 18 | 242 | 13.44 | 1.33 | 10.00 | 6.00 | 12.00 | 7.50 | 4.50 | 9.00 |
| 21 | 245 | 11.67 | 1.00 | 7.50 | 6.00 | 12.00 | 7.50 | 6.00 | 12.00 |
| 24 | 247 | 10.29 | 0.67 | 5.00 | 6.00 | 12.00 | 7.50 | 9.00 | 18.00 |
| 27 | 248 | 9.19 | 0.33 | 2.50 | 6.00 | 12.00 | 7.50 | 18.00 | 36.00 |
| 30 | 245 | 8.17 | -1.00 | -7.50 | 6.00 | 12.00 | 7.50 |  |  |

1. What is the profit-maximizing amount of water for each of the following price combinations?

a) potatoes at $7.50 and water at $6.00 \_\_\_\_\_ acre-inches.

b) potatoes at $7.50 and water at $12.00 acre-inches.

c) potatoes at $10.00 and water at $6.00 acre-inches.

d) potatoes at $4.00 and water at $12.00 acre-inches.

e) potatoes at $12.50 and water at $8.00 acre-inches.

2. Why does marginal value product decrease as more water is used?

3. Where does Stage III begin in this problem? WHY?

4. Assume all inputs other than water (those held constant) cost $1,390.00 total. At the profit-maximizing point for potatoes at $7.50 and water at $6.00, what is the profit per acre?

5. If water costs $6.00 per acre-inch, what would the price of potatoes have to be to make 238 cwt. the exact profit maximizing output?

II. Another typical farm or ranch problem is determining the optimum or profit-maximizing weight to sell fed cattle. Assume the feeder cattle are purchased at 600 pounds. The feed required and the weight gain is shown in the table below. Feed costs 7¢ per pound and feed cattle prices are as follows:

**Weight Price per Pound**

**600–899 lbs 72¢**

**900–1099 lbs 70¢**

**1100 lbs or more 67¢**

Pay attention to the price changes when computing MVP!!!



1. What is the profit-maximizing weight at which to sell fed cattle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. If feed costs 10¢ per pound, what would be the profit-maximizing weight?

3. How necessary was it to calculate APP to answer these questions?