## Problems

19.

Andrea’s Day Spa began to offer a relaxing aromatherapy treatment. The firm asks you how much to charge to maximize profits. The first two columns in [Table 10.5](#Table_10_02) provide the price and quantity for the demand curve for treatments. The third column shows its total costs. For each level of output, calculate total revenue, marginal revenue, average cost, and marginal cost. What is the profit-maximizing level of output for the treatments and how much will the firm earn in profits?

|  |  |  |
| --- | --- | --- |
| Price | Quantity | TC |
| $25.00 | 0 | $130 |
| $24.00 | 10 | $275 |
| $23.00 | 20 | $435 |
| $22.50 | 30 | $610 |
| $22.00 | 40 | $800 |
| $21.60 | 50 | $1,005 |
| $21.20 | 60 | $1,225 |

Table 10.5

20.

Mary and Raj are the only two growers who provide organically grown corn to a local grocery store. They know that if they cooperated and produced less corn, they could raise the price of the corn. If they work independently, they will each earn $100. If they decide to work together and both lower their output, they can each earn $150. If one person lowers output and the other does not, the person who lowers output will earn $0 and the other person will capture the entire market and will earn $200. [Table 10.6](#Table_10_06) represents the choices available to Mary and Raj. What is the best choice for Raj if he is sure that Mary will cooperate? If Mary thinks Raj will cheat, what should Mary do and why? What is the prisoner’s dilemma result? What is the preferred choice if they could ensure cooperation? A = Work independently; B = Cooperate and Lower Output. (Each results entry lists Raj’s earnings first, and Mary's earnings second.)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Mary** |  |
|  |  | A | B |
| **Raj** | A | ($100, $100) | ($200, $0) |
|  | B | ($0, $200) | ($150, $150) |

Table 10.6

21.

Jane and Bill are apprehended for a bank robbery. They are taken into separate rooms and questioned by the police about their involvement in the crime. The police tell them each that if they confess and turn the other person in, they will receive a lighter sentence. If they both confess, they will be each be sentenced to 30 years. If neither confesses, they will each receive a 20-year sentence. If only one confesses, the confessor will receive 15 years and the one who stayed silent will receive 35 years. [Table 10.7](#Table_10_07) below represents the choices available to Jane and Bill. If Jane trusts Bill to stay silent, what should she do? If Jane thinks that Bill will confess, what should she do? Does Jane have a dominant strategy? Does Bill have a dominant strategy? A = Confess; B = Stay Silent. (Each results entry lists Jane’s sentence first (in years), and Bill's sentence second.)

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Jane** |  |
|  |  | A | B |
| **Bill** | A | (30, 30) | (15, 35) |
|  | B | (35, 15) | (20, 20) |

Table 10.7