1. Refer to the figure above. You have $36 to spend on good X and good Y. If good X costs $6 and good Y costs $12, your budget constraint is
   A. AB.   B. BC.   C. CD.   D. DE.

2. Refer to the figure above. Given the budget constraint CB, which of the following consumption bundles you CANNOT afford to buy?
   A. 2Y and 1X.   B. 5Y and 2X.   C. 1Y and 4X.   D. 3Y and 7X.

3. If Pete enjoys his first pancake of the morning much more than his fifth pancake of the morning, he is exhibiting
4. At the utility maximizing equilibrium for two goods, X and Y, which of the following must be true?
   A. The marginal utility per dollar spent on X will exceed the marginal utility per dollar spent on Y.
   B. The total expenditure will be the same for each good.
   C. The marginal utility per dollar from X equals the marginal utility per dollar from Y.
   D. The marginal utility will be the same for each good.

5. Mark's marginal utility from reading books is the _______ when he reads _______.
   A. change in his total utility; one additional book
   B. total utility he gets; one more book
   C. change in his total utility; more books
   D. consumer surplus he gets; books

6. Economic profit is the difference between total revenue and
   A. the normal profit.
   B. interest costs of production.
   C. opportunity costs of production.
   D. the costs of resources bought in markets.

7. Economic efficiency occurs when the firm produces a given output
   A. by using the least amount of inputs.
   B. by using the maximum amount of inputs.
   C. at the least cost.
   D. at the greatest cost.

8. Carol Anne makes candles. If she charges $20 for each candle, her total revenue will be
   A. $1,000 if she sells 100 candles.
   B. $500 if she sells 25 candles.
   C. $20 regardless of how many candles she sells.
   D. $200 if she sells 5 candles.

9. The marginal cost curve will shift up if:
   A. a new technological improvement is introduced.
   B. the cost of one variable input in the production increases.
   C. demand increases.
   D. production increases.

10. Referring to the figure, the following statements are correct except:
    A. To the left of point E marginal cost exceeds marginal revenue.
    B. At point E marginal cost equals marginal revenue.
    C. To the right of point E marginal revenue is less than marginal cost.
    D. Output $Q_1$ is the most profitable output.
Part B: Essay Questions (70 points)

1. Sara’s income is $12 a week. The price of popcorn is $3 a bag, and the price of cola is $1.50 a can. The figure shows Sara’s preference map for popcorn and cola. (40 points)

A. Draw the Sara’s budget line on the diagram above. (10 points)

Answer: Sara’s budget line is shown on the graph above as the line $B_1B_1'$. We obtain this budget line by connecting the intersection points of $B_1$ and $B_1'$ which are found by dividing the income ($12) by the price of the products ($3 and $1.5, respectively).

B. What quantities of popcorn and cola does Sara buy? (4 points)

Answer: As shown by the utility maximizing point of $E$ in the graph above, Sara buys 1 unit of popcorn and 6 units of cola.

C. Now suppose that the price of cola rises to $3.00 a can and the price of popcorn and Sara’s income remain the same. (i) Draw the new budget line on the graph above. (ii) What quantities of cola and popcorn does Sara now buy? (10+4 points)

Answer: Because neither Sara’s income nor the price of popcorn has changed, the intersection of the budget line with the y-axis (point $B_1$) does not change. However, because of the rise in the price of cola, the maximum amount of cola that Sara can afford decreases from 8 to 4. Therefore, the new budget line becomes the line $B_1B_2$.

As shown by the point $E_2$, Sara maximises her utility by consuming 2 bags of popcorn and 2 cans of cola.
D. Draw the demand curve for cola given the change in price from $1.50 to $3.00. (12 points)

![Demand Curve]

2. Given the total product data for Joy’s Cleaners in the following table, answer the following questions. (30 points)

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>Number of suits cleaned daily</th>
<th>Marginal product of labor</th>
<th>Average product of labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>100</td>
<td>8</td>
<td>6.7</td>
</tr>
<tr>
<td>20</td>
<td>135</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>25</td>
<td>160</td>
<td>5</td>
<td>6.4</td>
</tr>
<tr>
<td>30</td>
<td>180</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

A. Complete the table above. (14 points)

**Answer:** See the calculations in bold fonts in the table.

B. Over what output range does Joy’s Cleaners enjoys increasing marginal returns? (5 points)

**Answer:** Increasing marginal returns occurs in the output range of 25 and 100. As we can see from the table, marginal product of the first fifteen workers increases from 5 to 8.

C. Over what output range does Joy’s Cleaners experience diminishing marginal returns? (5 points)

**Answer:** Joy’s Cleaners experiences diminishing marginal returns after the output level 100. That is to say, when the firm employs more than fifteen workers, productivity of each labour employed decreases.

D. Over what output range does Joy’s Cleaners experience rising marginal cost? (6 points)

**Answer:** It is known that as long as the marginal product of labour rises, the marginal cost falls. Furthermore, once diminishing returns to labour sets in, the marginal product of labour falls and marginal cost starts to rise again. Therefore, Joy’s Cleaners experience rising marginal cost in the output range of 100 and 180.