1. The graph shows \( F'(t) \), the rate of change of the value, \( F(t) \), of an investment over a 5-month period.

![Graph of rate of change of value of investment](image)

(a) When is the value of the investment increasing in value and when is it decreasing?
   The investment decreased in value during the first 3 months, since the rate of change of value is negative then. The value rose during the last 2 months.

(b) Does the investment increase or decrease in value during the 5 months.
   Total change in value = \( \int_{0}^{5} F'(t) \, dt \). This is the area under the curve. Since the area below the \( x \)-axis is greater than the area above the \( x \)-axis the integral is negative. Thus, the value of the investment during this time period has decreased.

2. The marginal cost, \( C'(q) \) (in dollars per unit) of producing \( q \) units is given in the following table

<table>
<thead>
<tr>
<th>( q )</th>
<th>0</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C'(q) )</td>
<td>25</td>
<td>20</td>
<td>18</td>
<td>22</td>
<td>28</td>
<td>35</td>
<td>45</td>
</tr>
</tbody>
</table>

(a) If the fixed cost is $10,000, estimate the total cost of producing 400 units.
   Use the average of the left and right hand sum to estimate the variable cost of producing 400 units
   \[
   \int_{0}^{400} C'(t) \, dt \approx 8,650
   \]
   Then the total costs is
   \[
   fixedcosts + variablecosts = 18,650.
   \]

(b) How much would the total cost increase if production increases one unit, to 401 units.
   \[
   C'(400) = 28.
   \]