Problem 2.2.6 There is an income tax on the planet Bozone. Both annual income, \( x \), and income tax, \( T(x) \), are measured in the local currency, the Bozat (B). The Bozonian tax table is shown below.

<table>
<thead>
<tr>
<th>At Least</th>
<th>But Less Than</th>
<th>Base Tax</th>
<th>Rate</th>
<th>Of Amount Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>B0</td>
<td>B1,000</td>
<td>0</td>
<td>10%</td>
<td>B0</td>
</tr>
<tr>
<td>B1,000</td>
<td>B2,500</td>
<td>B100</td>
<td>20%</td>
<td>B1,000</td>
</tr>
</tbody>
</table>

(a) Write a piecewise definition for the tax function \( T(x) \).

(b) Draw an accurate graph of the tax function \( T(x) \).
Problem 2.5.1.4 Suppose we invest $300.

(a) What amount will our account have after 7 years if it earns an annual rate of 3% compounded daily?

(b) How long will it take for our account to grow to $1000 if it is invested at an annual rate of 3% compounded continuously?
Problem 10.7.5 A company manufactures and sells $x$ widgets per week. The weekly price-demand function is $p(x) = 20 - x$, where $x$ is the number of widgets and $p$ is measured in dollars.

(a) Find the marginal revenue function.

(b) Use marginal revenue to estimate the additional revenue earned by producing 6 widgets instead of 5 widgets.

(c) What is the exact additional revenue earned by producing 6 widgets instead of 5 widgets?
Problem 11.7.5 Me-Tube manufactures bodysuits. The price-demand equation for their suits is \( x + 2p = 800 \), where \( x \) is the number of bodysuits that can be sold at a price of \( p \) dollars.

(a) Compute the elasticity of demand.

(b) At \( p = $150 \) demand is: (circle one) (i) inelastic, (ii) unitary, or (iii) elastic.

(c) At what price is the demand unitary?

(d) What will be the approximate change in demand if the price drops from $120 to $100?
Problem 12.6.6 Retro Phone Inc. manufactures and sells electronic rotary phones. The fixed cost is $200 and the variable cost is $4 per phone. The revenue function is \( R(x) = 22x - 0.3x^2 \).

(a) How many phones should be produced and sold to maximize profit? What is the maximum profit?

(b) Suppose that the fixed cost to produce phones increases to $300. Using the new fixed cost, how would the number of phones that maximize profit change? The number of phones that maximize profit would (i) be higher, (ii) be lower, (iii) remain the same.
(c) If the government imposes a tax of $.50 per phone, this will affect the production costs and thus the profits. As compared to the situation of the old costs, the output level that would maximize profits using the new costs would be (i) higher; (ii) lower; (iii) remain the same.