Example 6. Let \( C(q) \) represent the cost and \( R(q) \) represent the revenue, in dollars, of producing \( q \) items.

(a) If \( R(150) = 723,956 \) and \( R'(150) = 73 \), estimate \( R(152) \).

(b) If \( R'(150) = 73 \) and \( C'(150) = 79 \), approximately how much profit/loss is earned by the 151st item?

(c) If \( R'(200) = 81 \) and \( C'(200) = 79 \), should the company produce the 201st item? Why or why not?
Example 7. [Hughes-Hallet, 6e, 4.4#12] A manufacturing process has marginal costs given in the table; the item sells for $30 per unit.

(a) If the production level is 40, would it be beneficial to increase or decrease production?

(b) At which value(s) of $q$ does it appear that profit is at a local maximum?

<table>
<thead>
<tr>
<th>$q$</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>$MC$ ($/unit)</td>
<td>34</td>
<td>23</td>
<td>18</td>
<td>19</td>
<td>26</td>
<td>30</td>
<td>39</td>
<td>58</td>
<td>45</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>$MR$ ($/unit)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>
Example 8. [Hughes-Hallet, 6e, 4.4#22] At a price of $8 per ticket, a musical theater group can fill every seat in the theater, which has a capacity of 1500. For every additional dollar charged, the number of people buying tickets decreases by 75. Thus the quantity $q$ of tickets that is sold satisfies $q = 1500 - 75(p - 8)$, and the revenue as a function of $p$ is given by $R(p) = p(1500 - 75(p - 8))$.

(a) What is the revenue generated if the price is $p = 8$?
(b) What price will give a maximal revenue?