1. [10 points] Brianna is riding her unicycle on William Street. As she rides, she passes the Ann Arbor District Library. The function \( u(t) \) represents Brianna’s location (in meters west of the library) when she has been riding her unicycle for \( t \) seconds. The table below shows some values of \( u'(t) \), the derivative of \( u(t) \).

<table>
<thead>
<tr>
<th>( t )</th>
<th>0</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>18</th>
<th>20</th>
<th>23</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>( u'(t) )</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2.5</td>
<td>1.5</td>
<td>0</td>
<td>-1</td>
<td>-1.5</td>
<td>-2</td>
<td>-3</td>
</tr>
</tbody>
</table>

Note the following:

i) \( u(23) = 2 \).

ii) \( u'(t) \) is continuous.

iii) \( u'(t) \) satisfies:

- \( u'(t) \) is increasing on \((0, 10)\).
- \( u'(t) \) is decreasing on \((10, 30)\).

a. [2 points] Circle any of the following intervals on which \( u(t) \) could be invertible.

- [3, 8]
- [2, 15]
- [5, 20]
- [10, 25]
- NONE OF THESE

b. [3 points] \( u(t) \) is invertible on the interval \([20, 30]\). Let \( f(t) \) be the inverse of \( u(t) \) on that interval. Calculate \( f'(2) \) and include units.

Answer: ________________

c. [2 points] Find the value of \( \lim_{x \to 23} \frac{u(x) - u(23)}{x - 23} \). If the limit does not exist, write DNE. If it cannot be determined based on the information given, write NI.

Answer: ________________

d. [1 point] Estimate the value of \( u''(24) \).

Answer: ________________

e. [2 points] Which of the following values of \( t \) could be inflection points of \( u(t) \)?

- 5
- 10
- 17
- 18
- 23
- NONE OF THESE