1) To estimate the surface area of his backyard, a man takes several measurements. The measurements are taken every 3 feet for the 36 ft. long yard, where y represents the distance across the yard at each 3 ft. increment.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>21</th>
<th>24</th>
<th>27</th>
<th>30</th>
<th>33</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>9</td>
<td>11</td>
<td>8</td>
<td>13</td>
<td>16</td>
<td>10</td>
<td>12</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>13</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>

Estimate each Area using 12 subdivisions

a) Use Trapezoidal Rule

b) Estimate Avg. value using Trapezoidal Rule

c) Use Right Endpoint

d) Use Left Endpoint

e) Use 6 Midpoint subdivisions

2) Given \( f(x) = \sqrt{x^2 + 1} \) Approximate Area using 3 subdivisions from \([0,12]\).

a) Use Trapezoidal Rule

b) Estimate Avg. value using Trapezoidal Rule

c) Use Midpoint subdivisions

d) Use calculator to find actual Area
3) To estimate the surface area of a pool, a surveyor takes several measurements. The measurements are taken every 5 feet for the 40 ft. long pool, where \( y \) represents the distance across the pool at each 5 ft. increment.

<table>
<thead>
<tr>
<th>( x )</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>0</td>
<td>12</td>
<td>15</td>
<td>13</td>
<td>16</td>
<td>18</td>
<td>17</td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>

Estimate each Area using 8 subdivisions

\[ a\) \] Use Trapezoidal Rule

\[ b\) \] Use Right Endpoint

\[ c\) \] Use Left Endpoint

\[ d\) \] Use 4 Midpoint subdivisions

\[ e\) \] Estimate Avg. value using Midpoint

<table>
<thead>
<tr>
<th>( x )</th>
<th>0</th>
<th>2</th>
<th>3</th>
<th>6</th>
<th>11</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>25</td>
<td>29</td>
<td>32</td>
<td>24</td>
<td>27</td>
<td>30</td>
</tr>
</tbody>
</table>

4) Estimate each Area using 5 unequal subdivisions

\[ a\) \] Use Trapezoids

\[ b\) \] Estimate Avg. value using Trapezoids

\[ c\) \] Use Right Endpoint

\[ d\) \] Use Left Endpoint