0. (10 pts) Write down your name!

1. (15 pts) Let \( f(x) = x^3 - 3x^2 + 1 \). Find all critical points of \( f(x) \). What are the global maximum and global minimum of \( f(x) \) on the interval \( 0 \leq x \leq 4 \), and for what values of \( x \) are they attained?

2. (10 pts) Consider a function \( f(x) \) given by the following table:

<table>
<thead>
<tr>
<th>x</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>20</td>
<td>35</td>
<td>56</td>
</tr>
</tbody>
</table>

(a) Estimate \( \int_{5}^{20} f(x)dx \) using the left hand rule.
(b) Estimate \( \int_{5}^{20} f(x)dx \) using the right hand rule.
3. (10 pts) Estimate the area under the curve $y = 400 - x^2$, above the $x$-axis, and between the lines $x = -20$ and $x = 20$ using the left hand rule and 4 intervals.

4. (10 pts) The following graph shows the curve $y = f(x)$ with the areas of the shaded regions indicated. What is $\int_{-5}^{4} f(x) dx$?
5. (15 pts) A race car travels at a speed of $60t - 3t^2$ feet per second, at time $t$ seconds after the beginning of the race. How far does the car travel during the first three seconds of the race? What is its average speed during this period? Specify units.

6. (10 pts) Evaluate the following indefinite integrals:
   a) $\int (x^3 - x + 1) \, dx$
   b) $\int \cos t + \frac{1}{t} \, dt$
7. (10 pts) The level of a drug in the blood stream $t$ hours after an injection is given (in milligrams) by the following graph. Use the left hand rule to estimate bioavailability. Specify units.

![Graph showing drug level over time](image)

8. (10 pts) Evaluate the following definite integrals:
   a) $\int_2^5 2x + 1 \, dx$
   b) $\int_0^1 e^x \, dx$