0. (1 pt) Follow the instructions on this exam and any additional instructions given during the exam.

1. (5 pt) Suppose $f$ and $g$ are integrable functions on $\mathbb{R}$ such that $\int_{0}^{4} f(x) \, dx = 7$ and $\int_{0}^{4} g(x) \, dx = 5$.

   (a) What is the value of $\int_{0}^{4} \left( 2f(x) - 3g(x) \right) \, dx$?

   (b) If $\int_{0}^{6} f(x) \, dx = 4$, what is the value of $\int_{4}^{6} f(x) \, dx$?

   (c) What is the value of $\int_{-4}^{0} g(|x|) \, dx$?
2. Below is the graph of the function $f$:

(a) Compute $\int_{0}^{10} f(x) \, dx$.

(b) Compute $\int_{0}^{10} |f(x)| \, dx$.

(c) Suppose that $F$ is an antiderivative of $f$. Fill in the blank spaces in the below table.

<table>
<thead>
<tr>
<th>$F(0)$</th>
<th>$F(2)$</th>
<th>$F(7)$</th>
<th>$F(9)$</th>
<th>$F(10)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
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</table>
3. Evaluate the indefinite integrals:

(a) \[ \int \left( e^{-3x} + \sqrt{x} + e^3 \right) \, dx \]

(b) \[ \int \frac{4t^2 + 5t + 3}{t^2} \, dt \]
4. Evaluate the definite integral. Simplify as much as possible.
\[ \int_{0}^{\pi/3} [\tan(x)]^2 \, dx \]
5. Compute the derivative: \[ \frac{d}{dx} \int_{\sin(x)}^{x^3} \sin(1/t) \, dt \]