Directions: In groups of 3-4 students, work the problems on the following page. Below, list the members of your group and your answers to the specified questions. Turn this paper in at the end of class. You do not need to turn in the question page or your work.

Additional Instructions: We’ll spend some of the time on this worksheet, and some of the time reviewing for the exam. It is okay if you do not completely finish all of the problems. Also, each group member should work through each problem, as similar problems may appear on the exam.

Scoring:

<table>
<thead>
<tr>
<th>Correct answers</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>0–1</td>
<td>0%</td>
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<tr>
<td>2–3</td>
<td>80%</td>
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<tr>
<td>4–5</td>
<td>100%</td>
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</tbody>
</table>

Group Members:

5.3: Fundamental Theorem of Calculus.

(1) (a) \( F'(x) = \)

(b) \( G'(x) = \)

(2) \( F(x) = \)

(3) (a) State the critical point(s) and whether \( F \) has a local max, local min, or neither at each one:

(b) State the inflection point(s) and how the concavity of \( F \) changes at each one:
5.3: Fundamental Theorem of Calculus.

(1) Using the Fundamental Theorem of Calculus, compute the derivatives of the following functions:

(a) \( F(x) = \int_{2}^{x^2} \frac{x + 1}{x - 1} \, dx \)

(b) \( G(x) = \int_{\cos x}^{x^2} \ln(x + 3) \, dx \).

(2) Using the Fundamental Theorem of Calculus, give an antiderivative \( F(x) \) of \( f(x) = \sin^2(x) + e^{x^2} \) satisfying \( F(3) = 0 \). Your answer can involve a definite integral.

(3) Let \( F(x) = \int_{0}^{x} (t^2 - 6t + 8) \, dt \).

(a) Find the critical points of \( F \) (i.e. the points where \( F'(x) = 0 \)) and determine whether they are local minima or local maxima.

(b) Find the points of inflection of \( F \) (i.e. the points where \( F''(x) = 0 \)) and determine whether the concavity changes from up to down or from down to up at each one.