Sp'00: MATH 0000–001 Calculus 000 Instructor Name

Thursday 00/00/2000 Final Examination 120 minutes

Name: ___________________________ Student ID: ___________________________

Instructions.

1. Attempt all questions.
2. Do not write on back of exam sheets. Extra paper is available if you need it.
3. Show all the steps of your work clearly.
4. More Instructions here

<table>
<thead>
<tr>
<th>Question</th>
<th>Points</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>000</td>
<td></td>
</tr>
</tbody>
</table>
Q1] ... [10 points] Start of question.

A non-indented second part of the question after a 4.8inch skip.
Q2]...[10 points]
Q3]...[10 points]
Q4...[10 points]
Q5]...[10 points]
Q6]...[15 points]
Q7]...[10 points]
Q8]...[15 points]
Q9]...[10 points]
1. Trig Addition, Half Angle.

\[ \cos(A \pm B) = \cos(A) \cos(B) \mp \sin(A) \sin(B) \]
\[ \cos(2A) = \cos^2(A) - \sin^2(A) \]
\[ \cos(2A) = 2 \cos^2(A) - 1 \]
\[ \cos(2A) = 1 - 2 \sin^2(A) \]
\[ \sin^2(x) = (1 - \cos(2x))/2 \]
\[ \cos^2(x) = (1 + \cos(2x))/2 \]
\[ \sin(A \pm B) = \sin(A) \cos(B) \pm \cos(A) \sin(B) \]
\[ \sin(2x) = 2 \sin(x) \cos(x) \].

2. Hyperbolic.

\[ \sinh(x) = \frac{1}{2}(e^x - e^{-x}) \]
\[ \cosh(x) = \frac{1}{2}(e^x + e^{-x}) \]

3. Integration by Parts.

\[ \int u dv = uv - \int v du \]

4. Inverse Trig.

\[ \frac{d}{dx} \sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}} \]
\[ \frac{d}{dx} \tan^{-1}(x) = \frac{1}{1+x^2} \]
\[ \int \frac{dx}{x^2+a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) \]

5. Trig Substitutions.

For \( \sqrt{a^2 - x^2} \) use \( x = a \sin(\theta) \)
For \( \sqrt{a^2 + x^2} \) use \( x = a \tan(\theta) \)
For \( \sqrt{x^2 - a^2} \) use \( x = a \sec(\theta) \)

6. Center of Mass.

\[ \bar{x} = \frac{\int_a^b [f(x) - g(x)]x \, dx}{A} \]
\[ \bar{y} = \frac{\int_a^b [f(x)]^2 - [g(x)]^2 \, dx}{2A} \]
where \( A = \int_a^b [f(x) - g(x)] \, dx \).