Math 1151, Lecture 010, Evaluative Exercise 3
March 4, 2010

Name: _____

Discussion Section: _____

Discussion TA: _____

Seating Section: Left Front Right Front
Left Back Right Back

You have twenty-five minutes to complete the following six problems, without using your notes or your book. You may use a scientific a calculator.

Sum and Difference Formulas

$$\begin{aligned}
\cos(\alpha+\beta) &= \cos\alpha\cos\beta - \sin\alpha\sin\beta \\
\cos(\alpha-\beta) &= \cos\alpha\cos\beta + \sin\alpha\sin\beta \\
\sin(\alpha+\beta) &= \sin\alpha\cos\beta + \cos\alpha\sin\beta \\
\sin(\alpha-\beta) &= \sin\alpha\cos\beta - \cos\alpha\sin\beta
\end{aligned}$$

Double-angle Formulas

$$\begin{aligned}
\sin(2\theta) &= 2\sin\theta\cos\theta \\
\cos(2\theta) &= \cos^2\theta - \sin^2\theta \\
\cos(2\theta) &= 2\cos^2\theta - 1 \\
\cos(2\theta) &= 1 - 2\sin^2\theta
\end{aligned}$$

Half-angle Formulas

$$\begin{aligned}
\sin^2\frac{\alpha}{2} &= \frac{1-\cos\alpha}{2} \\
\cos^2\frac{\alpha}{2} &= \frac{1+\cos\alpha}{2}
\end{aligned}$$

1. Solve the equation. Give a general formula for all the solutions. List six solutions.

$$\sin(2\theta + \tfrac{\pi}{2}) = \tfrac{\sqrt{3}}{2}$$

2. Solve the equation on the interval $0 \leq \theta < 2\pi$:

$$2\sin^2\theta = \cos\theta + 1$$

3. David is building a wheelchair ramp from ground level to a doorway, which is 3 feet above the ground. He wants to make sure that the inclination of the ramp is no more than $15°$. How long should the ramp be in order for the angle of inclination to be $15°$?

4. For the triangle: $A = 30°$, $B = 20°$, $a = 5$,

   (a) Solve the triangle.

   (b) Compute the area of the triangle.

5. For the triangle: $a = 3$, $b = 4$, $C = 40°$,

   (a) Solve the triangle.

   (b) Compute the area of the triangle.

6. **Challenge:** Solve the triangle: $a = 6$, $b = 8$, $A = 35°$.