Group: _____ _____ _____   Name: _____

Math 231 A. Worksheet 4.

1. Fill in the table.

Expression	Substitution	dx	Identity
$\sqrt{a^2 - x^2}$	$x = a\sin\theta$	$dx = a\cos\theta\, d\theta$	$a^2 - a^2\sin^2\theta = a^2\cos^2\theta$
$\sqrt{a^2 + x^2}$			
$\sqrt{x^2 - a^2}$			

2. Evaluate the integrals using trigonometric substitution. State the necessary restriction on the angle θ.

(a) $\displaystyle\int \frac{x^2}{\sqrt{9 - x^2}}\, dx$

(b) $\displaystyle\int \frac{1}{\sqrt{25 + x^2}}\, dx$

3. Evaluate $\int \dfrac{x^3}{\sqrt{x^2 - 9}}\, dx.$

Hint: Instead of trigonometric substitution, try substituting $u = \sqrt{x^2 - 9}$. This trick would also work on $\int \frac{x}{\sqrt{x^2-9}}\, dx$, but would not work on $\int \frac{x^2}{\sqrt{x^2-9}}\, dx$ or $\int \frac{x^4}{\sqrt{x^2-9}}\, dx$

4. Evaluate $\int \dfrac{1}{\sqrt{x^2 + 2x}}\, dx.$ (Hint: Complete the square.)

5. Evaluate $\int (x - 2)^3 \sqrt{5 + 4x - x^2}\, dx.$