AP CALCULUS AB

TRIGONOMETRIC SUBSTITUTIONS

For problems **1** and **2**, verify the indefinite integrals by differentiation.

1)

$$\int \sec\theta \tan^2\theta \ d\theta =$$

$$= \frac{1}{2}\sec\theta\tan\theta - \frac{1}{2}\ln|\sec\theta + \tan\theta|$$

Hint: use $\tan^2\theta + 1 = \sec^2\theta$.

2)

$$\int \cos^2\theta \ d\theta =$$

$$= \frac{1}{2}\theta + \frac{1}{2}\sin\theta\cos\theta$$

Hint: use $\sin^2\theta + \cos^2\theta = 1$.

3) Use the triangle shown to make a trigonometric substitution to evaluate

$$\int \sqrt{a^2 - x^2}\, dx\,.$$

You will need the integral from problem **2**.