Practice Questions Over Sections 8.2 -8.4

1. Integrate by parts. Show work. $\int x \sin 5x \, dx$ = $\boxed{}$ $+ C$

u = _____ dv = _____dx

du = _____dx v = _____

2. Integrate by parts. Show work. $\int xe^{-x} \, dx$ = $\boxed{}$ $+ C$

u = _____ dv = _____dx

du = _____dx v = _____

3. Integrate by parts. Show work. $\int x \ln x \, dx$ = $\boxed{}$ $+ C$

u = _____ dv = _____dx

du = _____dx v = _____

4. Find the indefinite integrals. Show work.

a. $\int \tan^9 x \sec^2 x \, dx$ = _____ $+ C$

b. $\int \frac{\sec\theta}{\tan^2\theta} d\theta$ = _____ $+ C$

c. $\int \cos^2\theta \, d\theta$ = _____ $+ C$

d. $\int \sin^3 x \cos^6 x \, dx$ = _____ $+ C$

5. Consider the integral $\int \frac{\sin\theta}{\cos^2\theta} d\theta$.

a. Select which of these is the antiderivative for the integral $\int \frac{\sin\theta}{\cos^2\theta} d\theta$.

A. $\sin\theta + C$ B. $\cos\theta + C$ C. $\tan\theta + C$ D. $\csc\theta + C$ E. $\sec\theta + C$ F. $\cot\theta + C$
G. $-\sin\theta + C$ H. $-\cos\theta + C$ I. $-\tan\theta + C$ J. $-\csc\theta + C$ K. $-\sec\theta + C$ L. $-\cot\theta + C$
M. All of these. N. None of these.

b. Explain your reasoning for your selection.

6. Consider $\int \sec^{14} x \tan^{17} x \, dx$

(2) **a.** Suppose we let $u = \tan x$. Then $du =$ _____dx

Then we can write $\int \sec^{14} x \tan^{17} x \, dx = \int$ [ ] du.

Your answer is a binomial in terms of u raised to a power multiplied by u raised to a power.
Do not multiply it out. Do not find the antiderivative. Just leave it as a polynomial.

(2) **b.** Suppose we let $w = \sec x$. Then $dw =$ _____dx

Then we can write $\int \sec^{14} x \tan^{17} x \, dx = \int$ [ ] dw.

Your answer is a binomial in terms of w raised to a power multiplied by w raised to a power.
Do not multiply it out. Do not find the antiderivative. Just leave it as a polynomial.

The quiz will contain a bonus question on trig substitution. Here are some for practice.

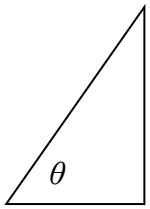
7. Integrate $\int \frac{25}{x^2\sqrt{x^2-25}} dx$, $x > 5$ using trig substitution.

a. Complete: $x = 5\sec\theta$ $dx =$ _____ $d\theta$, $\sqrt{x^2-25} =$ _____.

b. Write entirely in terms of θ. Simplify your answer in the boxes as much as possible. Show work.

$$\int \frac{25}{x^2\sqrt{x^2-25}} dx = \int (\quad) d\theta = \quad + C$$

Involves θ



c. Write entirely in terms of x. Label the right triangle to help you. Show work.

$$\int \frac{25}{x^2\sqrt{x^2-25}} dx = \quad + C$$

Involves x

8. Integrate $\int \frac{x}{\sqrt{16-x^2}}\,dx$ using trig substitution.

a. Complete: $x = 4\sin\theta$ $\quad dx =$ _____ $d\theta$, $\sqrt{16-x^2}$ = _____.

b. Write entirely in terms of θ. Simplify your answer in the boxes as much as possible.

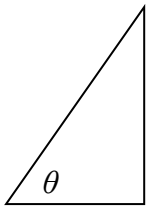
$$\int \frac{x}{\sqrt{16-x^2}}\,dx = \int \left(\qquad\qquad\right) d\theta = \qquad\qquad + C$$

Involves θ

c. Write entirely in terms of x. Label the right triangle and use it to help you. Show work.

$$\int \frac{x}{\sqrt{16-x^2}}\,dx = \qquad\qquad + C$$

Involves x



9. Integrate $\int \frac{x^2\,dx}{(x^2+36)^{3/2}}$ using trig substitution.

a. Complete: $x = 6\tan\theta$ $\quad dx =$ _____ $d\theta$, $\sqrt{x^2+36}$ = _____.

b. Write entirely in terms of θ. Simplify your answer in the boxes as much as possible.

$$\int \frac{x^2\,dx}{(x^2+36)^{3/2}} = \int \left(\qquad\qquad\right) d\theta = \qquad\qquad + C$$

Involves θ

c. Write entirely in terms of x. Label the right triangle and use it to help you. Show work.

$$\int \frac{x^2\,dx}{(x^2+36)^{3/2}} = \qquad\qquad + C$$

Involves x