Name_____

CALCULUS JOURNAL
TECHNIQUES OF INTEGRATION

1. a) Integration by parts should be used when the integration problem contains _____

_____.

b) The _____ rule of derivatives is the counterpart to integration by parts.

c) In integration by parts, you determine the function to be set equal to u by _____

_____ and the function set equal to dv by __

_____.

d) Repeated integration by parts occurs when _____

_____

e) When performing repeated integration by parts, you should NEVER _____

_____

d) What method should be applied when one or more applications of integration by parts results in the

same integration as the original problem? _____

_____

2. Integration using trig integrals methods should be applied when an integration problem contains

_____.

3. a) The method of trig substitution should be tried when a problem contains functions with expressions

in the form _____, _____ or _____.

b) You determine which trig substitution to use by the following rules:

Integral Expression	Substitution
	$x =$
	$x =$
	$x =$

c) If a trig substitution problem results in an expression like $3\sec\theta$ or $2\sin\theta\cos\theta$ after integrating,

it should be returned to the original variable by _____

_____.

d) If a trig substitution problem results in an expression such as 4θ after integrating, it should be

returned to the original expression by using _____

4. a) Partial fractions should be used when a problem contains _____

_____.

b) If you are given a rational expression in which the highest power in the numerator is greater than

the highest power in the denominator, you should do _____

before trying to break it into partial fractions.

5. List the following rules, facts, or formulas.
   a) Integration by Parts

   b) The following expressions occur frequently in the process of integration by parts. State the integration rules for each

   5) $\int \sin nx \, dx$

   2) $\int e^{nx} \, dx$

   3) $\int \tan x \, dx$

   4) $\int \cot x \, dx$

   5) $\int \ln x \, dx$

   c) Procedures for evaluating each of the following:
   $\int \sin mx \cos nx \, dx$

   $\int \sin^m x \cos^n x \, dx$

      m or n odd

      m & n even

6) The following expressions occur frequently in the process of integration with trig integrals or trig substitution. Show how to **completely** integrate each of them. If one of these eventually results in another on this page, write "continues with letter . . ."

a) $\int \cos^2 x \, dx$

b) $\int \sin^2 x \, dx$

c) $\int \frac{\cos \theta}{\sin^2 \theta} \, d\theta$

d) $\int \frac{\sec \theta}{\tan^2 \theta} \, d\theta$

e) $\int \frac{1}{\sec^2 \theta} \, d\theta$

f) $\int \tan^2 \theta \, d\theta$