Name: _____ Date: _____

QUIZ

Calculus: Integration 3

Integration Methods:
- Substitution and Change Variable
- Integration by Parts Method

Problem Solving

Directions:

You have 40 minutes to use Integral Techniques to solve the problems. Use Trigonometry and integrate. Use Triangle techniques when needed.

Pay close attention to the given hints.

Grade: _____

Teacher's Signature: _____

1. Substitution and Change Variable Problems

Evaluate : $\int \sin(5x)\,dx$

(Hint: Use substitute and change of variables technique.
Remember u = f(x) --> Du = Dx)

2. Evaluate: $\int x^2 \cdot \left(x^3 + 1\right)^5 dx$

(Hint: Use substitute and change of variables technique.
Remember u = f(x) --> Du = Dx)

3. Evaluate:

$$\int 2\sin(x)\cos(x)\,dx$$

(Hint: Use substitute and change of variables technique.
Remember u = f(x) --> Du = Dx)

4. Evaluate:

$$\int 3^{5x}\,dx$$

(Hint: Use substitute and change of variables technique,)

Also, remember the integral of the Exponential Function:

$$\int a^{x}\,dx = \frac{a^{x}}{\ln(a)}$$

5. Evaluate: $\int 4x \cdot 10^{2x^2}\,dx$

(Hint: Use substitute and change of variables technique,)

Also, remember the integral of the Exponential Function:

$$\int a^x\,dx = \frac{a^x}{\ln(a)}$$

6. Evaluate:

$$\int \frac{1}{x \cdot \ln(x)}\,dx$$

(Hint: Use substitute and change of variables technique.
Remember u = f(x) --> Du = Dx)

7. Prove that Integral of Cotangent is equal to:

$$\int \operatorname{ctan}(x)\,dx$$

(Hint: Use substitute and change of variables technique.
Remember u = f(x) --> Du = Dx
Also Remember that Cot (x) = cosin(x) / sin(x)

8. Integration by Parts Method Problems

Evaluate : $\int \ln(x)\,dx$

(Hint: Use the Integration by Parts method)

$$\int u\,dv = uv - \int v\,du$$

9. Evaluate: $\int x^4 \ln(x)\, dx$

(Hint: Use Integration by Parts technique)

$$\int u\, dv = uv - \int v\, du$$

10. Evaluate: $\int e^{x} \cos\left(x\right) dx$

(Hint: Use Integration by Parts technique)

$$\int u\,dv = uv - \int v\,du$$

There is a trick. Use equations in algebra, and add the terms.

11. Evaluate: $\int x^2 \sin(x)\, dx$

(Hint: Use the Integration by Parts technique)

$$\int u\, dv = uv - \int v\, du$$

(Or, Use Jaime Escalante's Tabular Approach to solve some Trigonometric Integrals)

12. Evaluate: $\int x^2 \cdot e^x \, dx$

(Hint: Use the Integration by Parts technique)

$$\int u \, dv = uv - \int v \, du$$

(Or, Use Jaime Escalante's Tabular Approach to solve some Trigonometric Integrals)