

AP Calculus BC  
Unit 8 – Integration Techniques

**Day 1 Notes: Integration by Substitution**

<b><u>Example 1:</u></b> $\int (x^2 + 1)^2(2x)dx$	<b><u>Example 2:</u></b> $\int 5\cos 5x dx$
<b><u>Example 3:</u></b> $\int x(x^2 + 1)^2 dx$	<b><u>Example 4:</u></b> $\int \sqrt{2x - 1} dx$
<b><u>Example 5:</u></b> $\int x\sqrt{2x - 1} dx$	<b><u>Example 6:</u></b> $\int \sin^2 3x \cos 3x dx$

**Example 7:**  $\int_0^1 x(x^2 + 1)^3 dx$

**Example 8:**  $\int_1^5 \frac{x}{\sqrt{2x-1}} dx$

**Your Turn:**

1)  $\int (5x^2 + 1)^2 (10x) dx$

2)  $\int u^2 \sqrt{u^3 + 2} du$

3)  $\int x \sqrt{x+2} dx$

4)  $\int_0^1 x \sqrt{2x+1} dx$

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Unit 8 – Day 1 – Assignment

Name: \_\_\_\_\_

#’s 1 – 10: Find the indefinite integral.

1) $\int (1 + 2x)^4 (2) dx$	2) $\int \sin 2x dx$
3) $\int \frac{x}{\sqrt{1-x^2}} dx$	4) $\int \frac{1}{x^2} \cos \frac{1}{x} dx$
5) $\int \left(1 + \frac{1}{x}\right)^3 \left(\frac{1}{x^2}\right) dx$	6) $\int x^2 \sqrt{1-x} dx$

$$7) \int \sqrt{9-x^2}(-2x)dx$$

$$8) \int x^3\sqrt{x^2+1}dx$$

$$9) \int \frac{x}{(1-x^2)^3} dx$$

$$10) \int \frac{x}{\sqrt{4x-1}} dx$$

**#'s 11 – 12: Evaluate the definite integral.**

$$11) \int_0^4 \frac{1}{\sqrt{2x+1}} dx$$

$$12) \int_0^{\pi/2} \cos\left(\frac{2x}{3}\right) dx$$