

No TI-89 or TI-92 calculators permitted.

1) $\int (\cos^3 x + \sin^2 x \cos x) dx$

2) $\int (\csc^2 x - \cos^2 x \csc^2 x) dx$

3) $\int \sec x \sin x \cot x dx$

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

5) $\int \frac{\tan x}{\sec x} dx$

6) $\int [\sin x (1 + \csc x)] dx$

7) $\int (1 + \tan^2 x) \cos^2 x dx$

8) $\int (\sec x - \sin x \tan x) dx$

9) $\int (\sec x + \tan x)(\sec x - \tan x) dx$

10) $\int \frac{\sec^2 x - 1}{\tan x} dx$

11) $\int \frac{\cot x}{1 + \cot^2 x} dx$

12) $\int \frac{\csc^2 x}{\csc^2 x - 1} dx$

13) $\int \frac{2 \cos^2 x - \sin^2 x + 1}{\cos x} dx$

14) $\int \left(\frac{1}{1 - \cos x} + \frac{1}{1 + \cos x} \right) dx$

15) $\int \frac{\cos x + \cot x}{\csc x + 1} dx$

AP CALCULUS AB Unit 8 Worksheet 4 Odd

$$1) \int (\cos^3 x + \sin^2 x \cos x) dx$$

$$\int [\cos x (\cos^2 x + \sin^2 x)] dx$$

$$\int \cos x dx$$

$$F(x) = \sin x + C$$

$$3) \int \sec x \sin x \cot x dx$$

$$\int \frac{1}{\cos x} \cdot \frac{\sin x}{1} \cdot \frac{\cos x}{\sin x} dx$$

$$\int dx$$

$$F(x) = x + C$$

$$5) \int \frac{\tan x}{\sec x} dx$$

$$\int \frac{\tan x}{1} \cdot \frac{1}{\sec x} dx$$

$$\int \frac{\sin x}{\cos x} \cdot \frac{\cos x}{1} dx$$

$$\int \sin x dx$$

$$F(x) = -\cos x + C$$

$$7) \int (1 + \tan^2 x) \cos^2 x dx$$

$$\int (\cos^2 x + \tan^2 x \cos^2 x) dx$$

$$\int (\cos^2 x + \frac{\sin^2 x}{\cos^2 x} \cdot \frac{\cos^2 x}{1}) dx$$

$$\int (\cos^2 x + \sin^2 x) dx$$

$$\int dx$$

$$F(x) = x + C$$

$$9) \int (\sec x + \tan x)(\sec x - \tan x) dx$$

$$\int (\sec^2 x - \tan^2 x) dx$$

Since $\sec^2 x = 1 + \tan^2 x$
 $\sec^2 x - 1 = \tan^2 x$

$$\int [\sec^2 x - (\sec^2 x - 1)] dx$$

$$\int dx$$

$$F(x) = x + C$$

$$11) \int \frac{\cot x}{1 + \cot^2 x} dx = \int \frac{\cot x}{\csc^2 x} dx = \int \cot x \sin^2 x dx =$$

$$\int \frac{\cos x}{\sin x} \cdot \frac{\sin^2 x}{1} dx = \int \cos x \sin x dx =$$

$$\int \frac{1}{2} \cdot 2 \sin x \cos x dx = \int \frac{1}{2} \sin 2x dx =$$

$$\frac{1}{2} \int \sin 2x dx$$

$$\frac{1}{2} \cdot \frac{1}{2} \cdot (-\cos 2x) + C$$

$$F(x) = -\frac{1}{4} \cos 2x + C$$

AP CALCULUS AB Unit 8 Worksheet 4 Odd

$$13) \int \frac{2\cos^2 x - \sin^2 x + 1}{\cos x} dx$$

$$\int \frac{2\cos^2 x - (1 - \cos^2 x) + 1}{\cos x} dx$$

$$\int \frac{2\cos^2 x - 1 + \cos^2 x + 1}{\cos x} dx$$

$$\int \frac{3\cos^2 x}{\cos x} dx$$

$$\int 3\cos x dx$$

$$F(x) = 3\sin x + C$$

$$15) \int \frac{\cos x + \cot x}{\csc x + 1} dx$$

$$\int \frac{\frac{\cos x}{1} + \frac{\cos x}{\sin x}}{\frac{1}{\sin x} + \frac{\sin x}{\sin x}} dx$$

$$\int \frac{\frac{\sin x}{\sin x} \cdot \frac{\cos x}{1} + \frac{\cos x}{\sin x}}{\frac{1 + \sin x}{\sin x}} dx$$

$$\int \frac{\frac{\sin x \cos x + \cos x}{\sin x}}{\frac{1 + \sin x}{\sin x}} dx$$

$$\int \frac{\sin x \cos x + \cos x}{\sin x} \cdot \frac{\sin x}{1 + \sin x} dx$$

$$\int \frac{\cos x (\sin x + 1)}{\sin x} \cdot \frac{\sin x}{1 + \sin x} dx$$

$$\int \cos x dx$$

$$F(x) = \sin x + C$$

AP CALCULUS AB Unit 8 Worksheet 4 Even

$$2) \int (\csc^2 x - \cos^2 x \csc^2 x) dx$$

$$\int [\csc^2 x (1 - \cos^2 x)] dx$$

$$\int \csc^2 x \sin^2 x dx$$

$$\int dx$$

$$F(x) = x + C$$

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

$$\int \frac{\cos x}{\sin x} \cdot \frac{\sin x}{1} dx$$

$$\int \cos x dx$$

$$F(x) = \sin x + C$$

$$6) \int [\sin x (1 + \csc x)] dx$$

$$\int (\sin x + 1) dx$$

$$F(x) = -\cos x + x + C$$

$$8) \int (\sec x - \sin x \tan x) dx$$

$$\int \left(\frac{1}{\cos x} - \frac{\sin x \cdot \sin x}{1 \cdot \cos x} \right) dx$$

$$\int \frac{1 - \sin^2 x}{\cos x} dx$$

$$\int \frac{\cos^2 x}{\cos x} dx$$

$$\int \cos x dx$$

$$F(x) = \sin x + C$$

$$10) \int \frac{\sec^2 x - 1}{\tan x} dx$$

$$\int \frac{\tan^2 x}{\tan x} dx$$

$$\int \tan x dx$$

$$\int \frac{\sin x}{\cos x} dx$$

$$u = \cos x$$

$$du = -\sin x dx$$

$$-du = \sin x dx$$

$$\int -\frac{du}{u}$$

$$F(u) = -\ln|u| + C$$

$$F(x) = -\ln|\cos x| + C$$

$$12) \int \frac{\csc^2 x}{\csc^2 x - 1} dx$$

$$\int \frac{\csc^2 x}{\cot^2 x} dx$$

$$\int \frac{\csc^2 x}{1} \cdot \frac{1}{\cot^2 x} dx$$

$$\int \frac{1}{\sin^2 x} \cdot \frac{\tan^2 x}{1} dx$$

$$\int \frac{1}{\sin^2 x} \cdot \frac{\sin^2 x}{\cos^2 x} dx$$

$$\int \frac{1}{\cos^2 x} dx$$

$$\int \sec^2 x dx$$

$$F(x) = \tan x + C$$

AP CALCULUS AB Unit 8 Worksheet 4 Even

$$14) \int \left(\frac{1}{1-\cos x} + \frac{1}{1+\cos x} \right) dx$$

$$\int \left(\frac{1}{1-\cos x} \cdot \frac{1+\cos x}{1+\cos x} + \frac{1}{1+\cos x} \cdot \frac{1-\cos x}{1-\cos x} \right) dx$$

$$\int \left(\frac{1+\cos x}{1-\cos^2 x} + \frac{1-\cos x}{1-\cos^2 x} \right) dx$$

$$\int \frac{2}{1-\cos^2 x} dx$$

$$\int \frac{2}{\sin^2 x} dx$$

$$\int 2 \csc^2 x dx$$

$$F(x) = -2 \cot x + C$$