

*Unit:* Methods of Integration

*Topic:* Methods of Integration Review

*Objective:* SWBAT integrate a function using the appropriate method.

*Directions:* Evaluate each of the following integrals and show all work.

1) Evaluate the following from  $u(a)$  to  $u(b)$ :  $\int_0^1 6x^2 e^{x^3} dx$

2)  $\int x \cot x^2 dx$

3)  $\int \frac{3}{x^2 + 5x - 14} dx$

$$4) \int 7\sin^{-1}x dx$$

$$5) \text{ Evaluate the integral from } u(a) \text{ to } u(b): \int_0^{\pi/2} \frac{\cos x}{(3+3\sin x)^3} dx$$

$$6) \int (x^3 - 1)^4 x^2 dx$$

$$7) \int \frac{7x}{2x^2+x-6} dx$$

$$8) \int \frac{x^2 - x + 2}{x^2 - x} dx$$

$$9) \int 2x^3 \ln x dx$$

$$10) \int e^{3x} \cos x dx$$

$$11) \int x^3 e^{2x} dx$$

$$12) \int \frac{5}{\sin^2 5x} dx$$

$$13) \int x^2 \sin x dx$$

$$14) \int \frac{1-3y}{\sqrt{2y-3y^2}} dy$$

$$15) \int \frac{dx}{\sqrt{x}(1-\sqrt{x})}$$

**Answer Key:**

1) $2e - 2$	2) $\frac{1}{2} \ln \sin x^2  + C$	3) $\frac{1}{3} \ln \left  \frac{x-2}{x+7} \right  + C$
4) $7x \sin^{-1} x + 7\sqrt{1-x^2} + C$	5) $\frac{1}{72}$	6) $\frac{1}{15} (x^3 - 1)^5 + C$
7) $\ln \left(  2x - 3 ^{3/2} (x + 2)^2 \right) + C$	8) $x + 2 \ln \left  \frac{x-1}{x} \right  + C$	9) $\frac{1}{2} x^4 \ln x  - \frac{1}{8} x^4 + C$
10) $\frac{e^{3x} \sin x + 3e^{3x} \cos x}{10} + C$	11) $\frac{1}{2} x^3 e^{2x} - \frac{3}{4} x^2 e^{2x} + \frac{3}{4} x e^{2x} - \frac{3}{8} e^{2x} + C$	12) $-\cot 5x + C$
13) $-x^2 \cos x + 2x \sin x + 2 \cos x + C$	14) $\sqrt{2y - 3y^2} + C$	15) $-2 \ln 1 - \sqrt{x}  + C$