Unit #2: Methods of Integration

Topic: Integration by Parts Table Method

Objective: SWBAT evaluate an integral involving the product of two functions by using the

integration by parts table method.

Warm Up #7:

Evaluate: $\int x^3 e^{2x} dx$



Would you like to see a shortcut?

The Table Method

This method is called <u>tabular integration</u>. This works when the derivatives of u eventually reach 0 and the integrals of dv never end. This is much quicker than using the formula over and over again.

Let's try this $\int x^3 e^{2x} dx$ again.

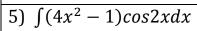
Example #2: $\int (x^3 + x)\cos(2x)dx$

<u>Problem Set #7</u>: Integrate each of the following using the tabular method for integration by parts.

inxdx	$2) \int t^2 e^{-3t} dt$
	nxdx

3)	$\int 2xe^{-x}dx$	

4) $\int x^2 \cos 3x dx$



6) $\int (x^2 - 5x)e^x dx$

7) $\int x^3 e^{4x} dx$

8) $\int x^2 \sin 5x dx$

Answer Key:

1)
$$-x^3\cos x + 3x^2\sin x + 6x\cos x - 6\sin x + C$$

2)
$$-\frac{1}{3}t^2e^{-3t} - \frac{2}{9}te^{-3t} - \frac{2}{27}e^{-3t} + C$$

3)
$$-2xe^{-x} - 2e^{-x} + C$$

4)
$$\frac{1}{3}x^2sin(3x) + \frac{2}{9}xcos(3x) - \frac{2}{27}sin(3x) + C$$

5)
$$\frac{1}{2}(4x^2-1)\sin 2x + 2x\cos 2x - \sin 2x + C$$

6)
$$(x^2 - 5x)e^x - (2x - 5)e^x + 2e^x + C$$

7)
$$\frac{1}{4}x^3e^{4x} - \frac{3}{16}x^2e^{4x} + \frac{3}{32}xe^{4x} - \frac{3}{128}e^{4x} + C$$

8)
$$-\frac{1}{5}x^2\cos 5x + \frac{2}{25}x\sin 5x + \frac{2}{125}\cos 5x + C$$