Entry #: _____

Lesson 6.2: Reverse Chain Rule & u-Substitution

Warm Up:

Differentiate:

1. $\frac{d}{dx}(1+5x)^4 =$
2. $\frac{d}{dx}\sin(1+5x) =$

Integrate:

3. $\int 5(1+5x)^3\,dx =$
4. $\int 5\cos(1+5x)\,dx =$

Note: You "hooked on" the derivative of the _____ in Examples 1 and 2, so you had to "unhook" the derivative of the inside function in Examples 3 and 4.

Rule	x Form	u Form (Reverse Chain Rule)
Power Rule		
Trig Rules	$\int \cos(x)\,dx =$	
	$\int \sin(x)\,dx =$	
	$\int sec^2(x)dx =$	
	$\int csc^2(x)dx =$	
	$\int \sec(x)\tan(x)\,dx =$	
	$\int \csc(x)\cot(x)\,dx =$	

Examples: Integrate.

1. $\int (3x-1)^{10}\, dx$

2. $\int (3t^2+2t)(t^3+t^2)\, dt$

3. $\int \frac{6x^2}{\sqrt{4x^3-5}} dx$

4. $\int (y^3+1)^2\, dy$

5. $\int \sin(4x)\, dx$

6. $\int 3\theta\, cos(\theta^2)\, d\theta$

7. $\int sin^2(x)\cos(x)\, dx$

u-Substitution

For more complicated integration problems, simple rules for integration might fail and you may have to make some type of substitution to be able to integrate.

Procedure:

1	
2	
3	
4	
5	

Examples: Integrate.

1. $\int x\sqrt{x-1}dx$

2. $\int \frac{2x-1}{\sqrt{2x+3}}\,dx$

3. $\int \frac{\sin(3x)}{\sqrt{5+\cos(3x)}}dx$

4. $\int(\sin^2(x))(\cos(x))dx$