RS #60 The Chain Rule

$$\frac{d}{dx}\Big(f(u)\Big)=f'\Big(u\Big)\bullet u'$$

u= the inside function

If $y=f(u)$ where us is the inside function, then

$$\frac{dy}{dx}=\frac{dy}{du}\bullet\frac{du}{dx}$$

3.6 The Chain Rule

Objectives:

- I can use the chain rule to take the derivative of composed functions

Take the derivative of the following

1. $y=(x-3)^2$

2. $y=\sin(x^2+3)$

3. $y=\cos(\tan x)$

4. $y=\dfrac{1}{x^2-5}$

Take the derivative of the following

5. $y=\tan^2 x$

6. $y=\dfrac{1}{(2x^2+1)^2}$

7. $y=\left(\dfrac{\cos x}{\sin x+1}\right)^2$

8. $y=3\sin\left(\dfrac{2}{x}\right)$

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Take the derivative of the following

9. $y=(1+\sin 2x)^2$

10. $y=\sqrt{\sin 3x}$

11. $y=\sin\left(\frac{3}{x}\right)$

12. $y=\frac{1}{\sin x}$

Find the derivative of each function

13. $y=\sqrt{x+\cos x}$

$f(x)=\sin^2 x$

$g(x)=\frac{3}{(x^2+1)^2}$

Find the derivative

1. $y=(\csc x+\cot x)^{-1}$

2. $f(x)=x^3(2x-5)^4$

Find the derivative

3. $y=4\sqrt{\sec x+\tan x}$

4. $g(x)=\frac{x}{\sqrt{1+x^2}}$

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Find the derivative:

5. $y = (1+\cos 2x)^2$

6. $y = \sqrt{\tan 5x}$

Find the derivative:

7. $r = \sec(2\theta)\tan(2\theta)$

Find the second derivative

8. $f(x) = \cot x$

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9. $f(x) = 9\tan\left(\frac{x}{3}\right)$

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