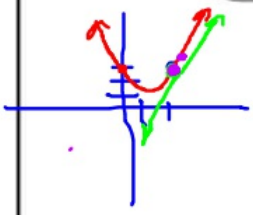
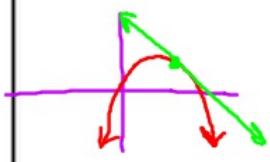
What you'll Learn About
Linearization is another term for tangent line
Differentials are part of the derivative
Mean Value Theorem





a) Find the linearization of the function. b) Find L(a + .1) and f(a + .1)
c) Using concavity, determine if the Tangent Line at a is an overestimate or an underestimate. Justify your answer.

2. $f(x)=x^2-2x+3$ $a=2$ = x

a) $f'(x)=2x-2$ (2, 3)

$f'(2)=2$

$y=3+2(x-2)$

c) $f''(x)=2>0$

f(x) concave up

Linearization underestimate

original → b) $f(2.1)=(2.1)^2-2(2.1)+3=3.21$

tangent line → $L(2.1)=3+2(2.1-2)=3.2$

1. ~~$f(x)=\sqrt{1+x}$ $a=0$~~

$a=-1$

$f(x)=x+\frac{1}{x}$

$f(x)=x+x^{-1}$

a) $f'(x)=1-x^{-2}$

$f'(-1)=1-\frac{1}{x^2}$

$f'(-1)=0$ $(-1,-2)$

$y=-2+0(x+1)$

$y=-2$

b) $f(-.9)=-.9+\frac{1}{-.9}=-2.011$

$L(-.9)=-2$

c) $f''(x)=2x^{-3}=\frac{2}{x^3}$

$f''(-1)=\frac{2}{(-1)^3}<0$

f(x) concave down

Linearization is overestimate