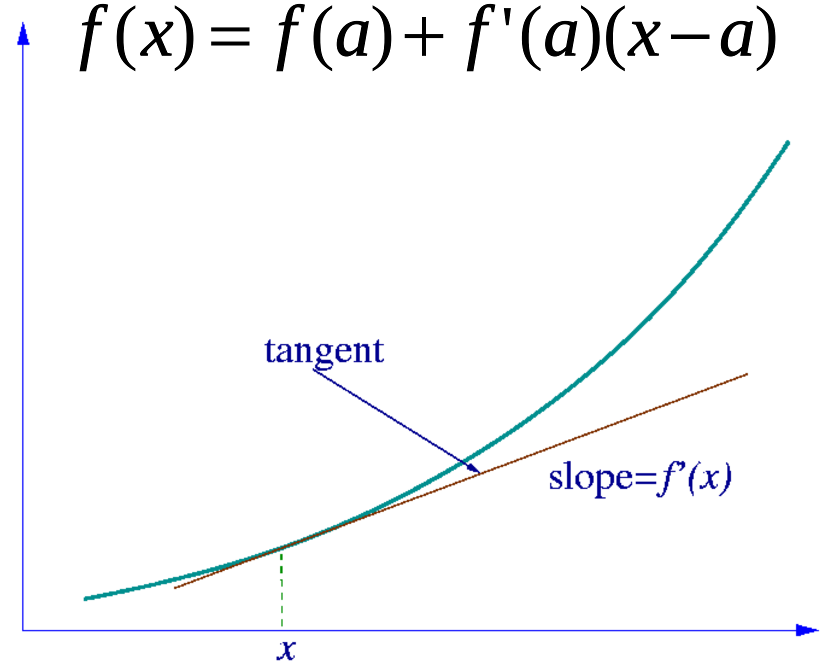
Jeffrey Seguritan
11/01/2007

Find the linearization of *f* at *a* = 16. Use the linearization to approximate: $\sqrt{16.01}$

$$f(x) = f(a) + f'(a)(x-a)$$



So linearization helps us approximate function values using the instantaneous slope (the derivative) and pretending as if the function continued away from the point in a linear fashion.

In this case, Let a = 16, apply the linearization formula and plug in x = 16.01

$$f(x) = f(a) + f'(a)(x-a)$$

$$f(x) = \sqrt{a} + \frac{1}{2\sqrt{a}}(x-a)$$

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Find the linearization of *f* at *a* = 16. Use the linearization to approximate: $\sqrt{16.01}$

$$f(x) = f(a) + f'(a)(x-a)$$

So now let's plug in our values:

$$f(x) = \sqrt{a} + \frac{1}{2\sqrt{a}}(x-a)$$

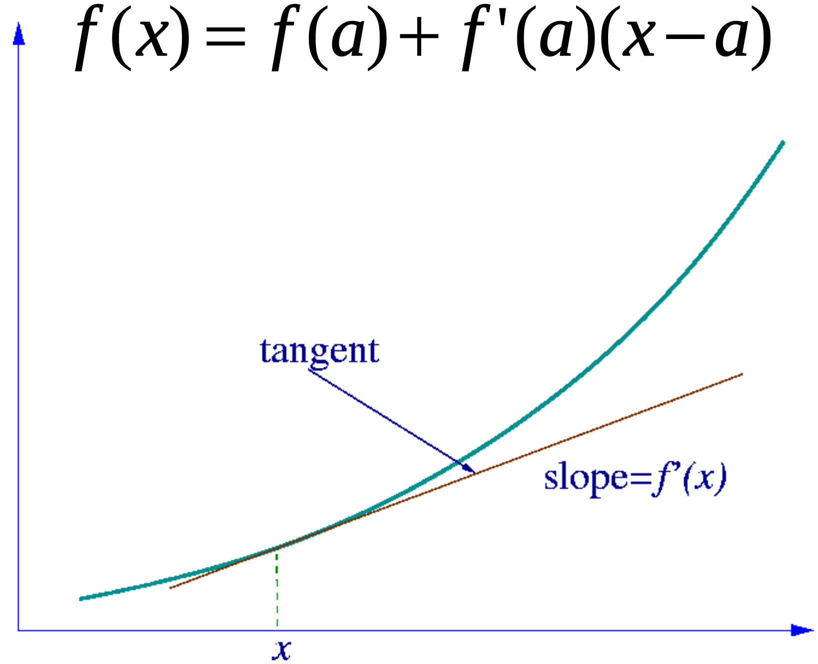
$$f(x) = \sqrt{16} + \frac{1}{2\sqrt{16}}(x-16)$$

$$f(16.01) = \sqrt{16} + \frac{1}{2\sqrt{16}}(16.01-16)$$

$$f(16.01) = 4 + \frac{1}{8}(0.01)$$

$$f(16.01) = 4 + 0.00125$$

$$f(16.01) = 4.00125$$



Really, this is just pluggin' and chuggin'. No sweat!

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ziizoo beta ™

Find the intervals where h is increasing or decreasing. Find the local max and min values of h.

$$h(x)=\frac{2x^2-5x+7}{x^2-9}$$

First things first:
Find the derivative!

$$h(x)=\frac{2x^2-5x+7}{x^2-9}$$

$$h'(x)=\frac{(4x-5)(x^2-9)-2x(2x^2-5x+7)}{(x^2-9)^2}$$

$$h'(x)=\frac{4x^3-36x-5x^2+45-4x^3+10x^2-14x}{(x^2-9)^2}$$

$$h'(x)=\frac{5(x^2-10x+9)}{(x^2-9)^2}$$

$$h'(x)=\frac{5(x-9)(x-1)}{(x^2-9)^2}$$

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Find the intervals where h is increasing or decreasing. Find the local max and min values of h.

$$h(x)=\frac{2x^2-5x+7}{x^2-9}$$

So the critical values of a function (values that can be min and max) are the zeroes of the derivative.

$$h'(x)=\frac{5(x-9)(x-1)}{(x^2-9)^2}$$

→

$x = 1$

$x = 9$

Using the critical values as boundaries, test the intervals to see if increasing or decreasing. Remember, if h'(x) > 0, then increasing, and vice versa.

X < 1

$$h'(0)=\frac{5(-9)(-1)}{(-9)^2}=\frac{45}{36}>0$$

1 < X < 9

$$h'(2)=\frac{5(-7)(1)}{(-5)^2}=-\frac{35}{25}<0$$

9 < X

$$h'(10)=\frac{5(1)(9)}{(91)^2}=\frac{45}{(91)^2}>0$$

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Find the intervals where h is increasing or decreasing. Find the local max and min values of h.

$$h(x)=\frac{2x^2-5x+7}{x^2-9}$$

X < 1 $h'(0)=\frac{5(-9)(-1)}{(-9)^2}=\frac{45}{36}>0$ INCREASING

1 < X < 9 $h'(2)=\frac{5(-7)(1)}{(-5)^2}=-\frac{35}{25}<0$ DECREASING

9 < X $h'(10)=\frac{5(1)(9)}{(91)^2}=\frac{45}{(91)^2}>0$ INCREASING

X = 1 is MAX

X = 9 is MIN

Plug in values to original function to get min and max values

$h(1)=\frac{2-5+7}{1^2-9}=\frac{4}{-8}=-\frac{1}{2}$ LOCAL MAX

$h(9)=\frac{2(9)^2-5(9)+7}{81-9}=\frac{124}{72}$ LOCAL MIN