

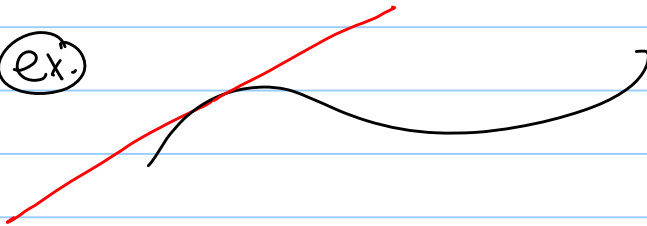
2.1

Note Title

8/1/2007

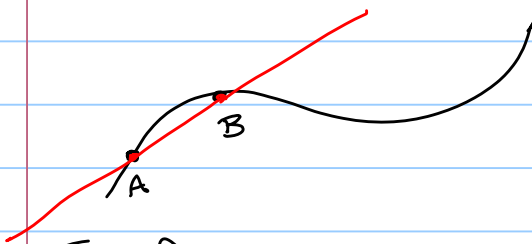
Tangent Line

(ex.)



Can't find equation of tangent point. 'cus only have one need 2 to find equation.

Secant Line



(ex.) find equation of a secant line of $y = x^2$ at $P(1,1)$

We need another point, say $Q(1.5, 2.25)$

$$m_{PQ} = \frac{2.25 - 1}{1.5 - 1} = \frac{1.25}{.5} = 2.5$$

$$y - 1 = 2.5(x - 1)$$

If we move Q closer to P the secant line will move closer to the tangent line

X_Q	m_{PQ}
2	3
1.5	2.5

X_Q	m_{PQ}
1.1	2.1
1.01	2.01
1.001	2.001

X_Q	m_{PQ}
0	1
.5	1.5
.9	1.9
.99	1.99

As someone (or something) accelerates its velocity is changing, but what if I want to know it at an exact moment. Called instantaneous velocity.

$$\text{Average Velocity} = \frac{\text{change in position}}{\text{change in time}}$$

(ex.) A dust bunny is moving across the floor by $s = 5t^2 + 8t$. Find avg vel.

at $[1, 2]$, $[1, 1.5]$, and $[1, 1.1]$

For $[1, 2]$

$$s_1 = 13$$

$$s_2 = 5 \cdot 2^2 + 8 \cdot 2$$

$$= 20 + 16 = 36$$

$$\text{avg vel} = \frac{36 - 13}{2 - 1} = \frac{23}{1} = 23 \text{ cm/sec}$$

Time	Avg. Vel.
$[1, 2]$	23
$[1, 1.5]$	20.5
$[1, 1.1]$	18.5