AP Calculus AB
Tuesday, November 19, 2013

For each function, find the value that satisfies the MVT on the given interval. Check by graphing.

1

$$f(x) = x^2 - 5x + 7,\ -1 \le x \le 3$$

f(x) cont & diff ✓

$$m_{sec} = \frac{f(3) - f(-1)}{3 - -1} = \frac{9 - 15 + \cancel{7} - (1 + 5 + \cancel{7})}{4}$$

$$m_{sec} = -3$$

$$f'(x) = 2x - 5$$

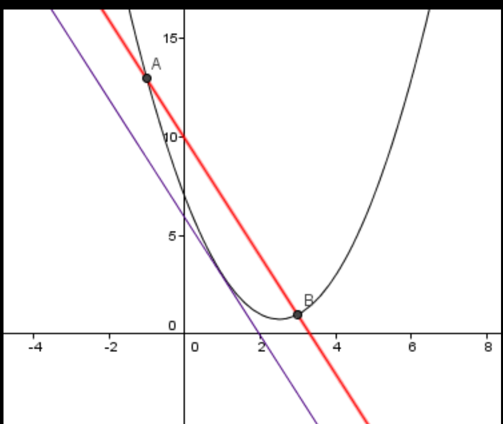
$$2x - 5 = -3$$

$$x = 1$$

$$f(1) = 1^2 - 5 \cdot 1 + 7 = 3$$

$$f'(1) = 2 \cdot 1 - 5 = -3$$

Eqn of tangent line $y - 3 = -3(x - 1)$



$$f(x) = x\cos(\sqrt{x}),\ 0 \le x \le 50$$

continuous?

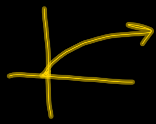
$x \rightarrow$ cont & diff. everywhere

$\sqrt{x}$

Domain: $[0, \infty)$

Continuous on domain ✓

Diff. on $(0, \infty)$ ✓

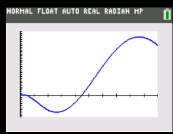


cosine is continuous ✓

also differentiable ✓

$\therefore$ We can use MVT.

```
NORMAL FLOAT AUTO REAL RADIAN MP
WINDOW
 Xmin=0
 Xmax=50
 Xscl=5
 Ymin=-15
 Ymax=45
 Yscl=1
 Xres=1
 ΔX=.18939393939394
 TraceStep=.37878787878788
```



$$m_{sec} = \frac{f(50) - f(0)}{50 - 0}$$

$$m_{sec} = \frac{50\cos\sqrt{50}}{50}$$

$$m_{sec} = \cos\sqrt{50}$$

Radians

$$f(x) = x\cos\sqrt{x}$$

$$f'(x) = x\left[-\sin\sqrt{x}\right]\left[\tfrac{1}{2}x^{-1/2}\right] + \cos\sqrt{x}$$

$$f'(x) = -\frac{x^1 \sin\sqrt{x}}{2\sqrt{x}} + \cos\sqrt{x}$$

$$f'(x) = -\frac{x^{1/2}\sin\sqrt{x}}{2} + \cos\sqrt{x}$$

$$f'(x) = -\frac{\sqrt{x}\sin\sqrt{x}}{2} + \cos\sqrt{x}$$

$$-\frac{\sqrt{x}\sin\sqrt{x}}{2} + \cos\sqrt{x} = \cos\sqrt{50}$$

Solve for x.

It is not possible to use analytical techniques to solve this. We must solve by graphing.

```
NORMAL FLOAT AUTO REAL RADIAN MP
cos(√50
                 .7053479063
X→A
                 .3062145847
X→B
                 15.49848984
X→C
                 40.63366242
```

Do odds... pop quiz