Anybody with a school computer and having problems taking tests on WebAssign with the lock-down browser?

I need your tag number off your laptop.

21. [–/2 Points] DETAILS **SCALC8 2.5.078.** PRACTICE ANOTH

A model for the length of daylight (in hours) in Philadelphia on the tth day of the year is

$$L(t) = 12 + 2.8 \sin\left[\frac{2\pi}{365}(t - 80)\right].$$

$\Rightarrow L'(t) = 2.8 \cos\left(\frac{2\pi}{365}(t-80)\right)\left(\frac{2\pi}{365}\right)$

Use this model to compare how the number of hours of daylight is increasing in Philadelphia on April 21 and May 21. (Assume there are 365 days in a year. Round your answers to four decimal places.)

April 21	$L'(t)$ =	✗	0.0415
May 21	$L'(t)$ =	✗	0.0240

J 31
F 28
M 31
A 21

111

$L'(111) \approx$ 0.04149812957

18. [–/2 Points] DETAILS SCALC8 2.5.063.

A table of values for *f*, *g*, *f* ', and *g*' is given.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	2	4	6
2	1	8	5	7
3	7	2	7	9

(a) If $h(x) = f(g(x))$, find $h'(1)$.

$h'(1) =$

(b) If $H(x) = g(f(x))$, find $H'(2)$.

$H'(2) =$

$h(x) = f(g(x)) \longrightarrow$

$h'(x) = f'(g(x))g'(x)$

$= \frac{df}{dg} \cdot \frac{dg}{dx}$

$\longrightarrow$

$h'(1) = f'(g(1))\,g'(1)$

$= f'(2) \cdot 6$

$= 5 \cdot 6 = 30$

19. [–/2 Points] DETAILS **SCALC8 2.5.076.**

If the equation of motion of a particle is given by $s = A\cos(\omega t + \delta)$, the particle is said to undergo *simple harmonic motion*.

(a) Find the velocity of the particle at time t.

$s'(t) =$ ☐ ✖

$\Rightarrow s'(t) = A(-\sin(\omega t + \delta))(\omega)$

$= -\omega A \sin(\omega t + \delta)$

(b) When is the velocity 0? (Use n as the arbitrary integer.)

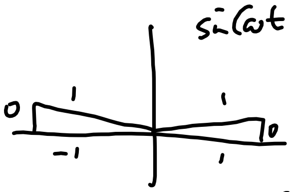
$t =$ ☐ ✖

Solve $s'(t) = 0 \Rightarrow$

$-\omega A \sin(\omega t + \delta) = 0 \Rightarrow$

$\sin(\omega t + \delta) = 0$

$\sin(\omega t + \delta) = 0$



$\omega t + \delta = n\pi$, $\underbrace{n = 0, \pm 1, \pm 2, \dots}_{n \in \mathbb{Z}}$

$\Rightarrow \omega t = n\pi - \delta$

$\Rightarrow t = \dfrac{n\pi - \delta}{\omega}$

Section 2.6 - Implicit Differentiation.

4. [–/1 Points] DETAILS SCALC8 2.6.014.

Find dy/dx by implicit differentiation.

$$5y\sin(x^2) = 9x\sin(y^2)$$

$y' =$

$$5y'\sin(x^2) + 5y(\cos(x^2)(2x)) = 9\sin(y^2) + 9x(\cos(y^2)\cdot 2y\cdot y')$$

$$(5\sin(x^2) - 18xy\cos(y^2))y' = 9\sin(y^2) - 10xy\cos(x^2)$$

$$y' = \frac{9\sin(y^2) - 10xy\cos(x^2)}{5\sin(x^2) - 18xy\cos(y^2)}$$

$$\boxed{\frac{9\sin(y^2) - 10xy\cos(x^2)}{5\sin(x^2) - 18xy\cos(y^2)}}$$

25–32 Use implicit differentiation to find an equation of the tangent line to the curve at the given point.

25. $y \sin 2x = x \cos 2y, \quad (\pi/2, \pi/4)$

$$\Rightarrow \quad y'\sin(2x) + y(\cos(2x)\cdot 2) = \cos(2y) + x(-\sin(2y)\cdot 2y')$$

$$(\sin(2x) + 2x\sin(2y))\,y' = \cos(2y) - 2y\cos(2x)$$

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

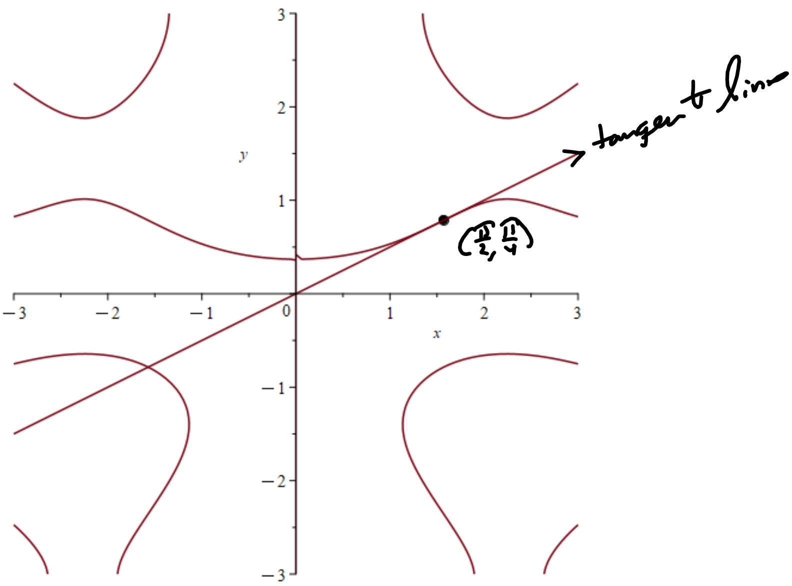
$$y'\Big|_{(x,y)=(\frac{\pi}{2},\frac{\pi}{4})} = \frac{\cos(2(\frac{\pi}{4})) - 2(\frac{\pi}{4})\cos(2(\frac{\pi}{2}))}{\sin(2(\frac{\pi}{2})) + 2(\frac{\pi}{2})\sin(2(\frac{\pi}{4}))}$$

$$= \frac{\cos(\frac{\pi}{2}) - \frac{\pi}{2}\cos(\pi)}{\sin(\pi) + \pi\sin(\frac{\pi}{2})} = \frac{0 - \frac{\pi}{2}(-1)}{0 + \pi(1)} = \frac{\frac{\pi}{2}}{\frac{\pi}{1}} = \boxed{\frac{1}{2} = m}$$

$$y = m(x - x_1) + y_1$$

$$\boxed{= \frac{1}{2}\left(x - \frac{\pi}{2}\right) + \frac{\pi}{4}}$$ is fine.

WebAssign's OK with it, too.



#5

Writing Project #1 Stuff

Let

$y = (x^5 - 2x)^7 (5x+2)^3 \longrightarrow$

$y' = 7(x^5-2x)(5x^4-2)(5x+2)^3 + (x^5-2x)^7(3(5x+2)^2(5))$

STOP!

$y = \sin(\cos(7x^2+2x)) \longrightarrow$

$y' = \cos(\cos(7x^2+2x))(-\sin(7x^2+2x)(14x+2))$

6. (10 pts) Find an equation of the tangent line to $f(x) = \cos(x)$ at $x = \frac{\pi}{4}$. Then sketch the graph of this situation, with the function and its tangent line, together on the same set of axes.

$f'(x) = -\sin(x)$

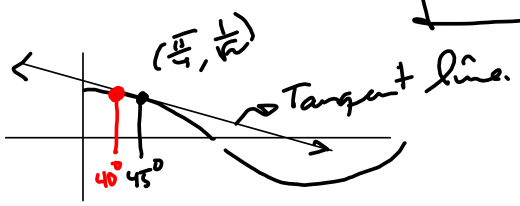
$f'(\frac{\pi}{4}) = -\sin(\frac{\pi}{4}) = -\frac{1}{\sqrt{2}}$ OR $-\frac{\sqrt{2}}{2}$

$L(x)$ = Linearization of f = $f'(\frac{\pi}{4})(x - \frac{\pi}{4}) + f(\frac{\pi}{4})$

$= m(x - x_1) + y_1$

$f(\frac{\pi}{4}) = \cos(\frac{\pi}{4}) = \frac{1}{\sqrt{2}}$ OR $\frac{\sqrt{2}}{2}$

$L(x)$ = tangent line = $\boxed{-\frac{1}{\sqrt{2}}(x - \frac{\pi}{4}) + \frac{1}{\sqrt{2}} = y}$



7. (5 pts) Use your result from the previous problem to approximate $\cos\left(40^0\right)$

The whole trick is converting $40°$ to radians

$$40^0\left(\frac{\pi}{180^0}\right) = \left(45^0 - 5^0\right)\frac{\pi}{180^0}$$

$$= 45^0\left(\frac{\pi}{180^0}\right) - 5^0\left(\frac{\pi}{180^0}\right)$$

$$= \frac{\pi}{4} - \frac{\pi}{36}$$

$$L(40^0) = L\left(\frac{\pi}{4} - \frac{\pi}{36}\right) = -\frac{1}{\sqrt{2}}\left(\frac{\pi}{4} - \frac{\pi}{36} - \frac{\pi}{4}\right) + \frac{1}{\sqrt{2}}$$

$$= -\frac{1}{\sqrt{2}}\left(-\frac{\pi}{36}\right) + \frac{1}{\sqrt{2}} = \boxed{\frac{-\pi}{36\sqrt{2}} + \frac{1}{\sqrt{2}}}$$