

EMCF 13

Log in to CourseWare at <http://www.casa.uh.edu> and access the EMCF tab.

- Find the slope of the normal line to the graph of $x^2 + xy - 3y^2 = 1$ at the point $(1,0)$.
 - 0
 - $1/2$
 - $-1/2$
 - 2
 - 2
 - None of these.
- Find the slope of the normal line to the graph of $f(x) = \sqrt{2x+1} + \cos(\pi x)$ at the point where $x = 4$.
 - 3
 - 3
 - $3 - 1/\pi$
 - $-3 - 1/\pi$
 - 0
 - None of these.
- An object is moving along the graph of $f(x) = x^2$. When it reaches the point $(2,4)$ the x coordinate of the object is decreasing at the rate of 3 units/sec. Give the rate of change of the distance between the object and the point $(0,1)$ at the instant when the object is at $(2,4)$.
 - 4 units/sec
 - 2 units/sec
 - $-\frac{42}{\sqrt{13}}$ units/sec
 - $-\frac{31}{\sqrt{13}}$ units/sec
 - $-\frac{22}{\sqrt{13}}$ units/sec
 - None of these
- A balloon retains a spherical shape as it is inflated. In addition, the balloon has a volume that is increasing at the constant rate of $1 \text{ cm}^3/\text{sec}$. Give the rate of change in the surface area of the balloon when $r = 1$.
 - $1/3 \text{ cm}^2/\text{sec}$
 - $1/4 \text{ cm}^2/\text{sec}$
 - $1 \text{ cm}^2/\text{sec}$
 - $2 \text{ cm}^2/\text{sec}$
 - $\pi \text{ cm}^2/\text{sec}$
 - None of these.

5. Give the slope of the tangent line to the graph of $f(x) = x \cos\left(\frac{\pi}{2}x\right)$ at the point where $x = -1$.
- $-1/2$
 - $1/2$
 - $-\pi/2$
 - $\pi/2$
 - 0
 - None of these.
6. Give the rate of change of the surface area of a sphere with respect to its radius when the radius is 2.
- 8π
 - 16π
 - 4π
 - 2π
 - 0
 - None of these.
7. The height and radius of an expanding right circular cone are always equal, and the volume of the cone is increasing at the rate of 2 cubic inches per minute. How fast is the radius growing when the height is 2 inches?
- $\frac{3}{2\pi}$ in/min
 - $\frac{2}{3\pi}$ in/min
 - $\frac{3}{4\pi}$ in/min
 - $\frac{3}{4\pi}$ in/min
 - π in/min
 - None of these.
8. Give the slope of the normal line to the graph of $f(x) = x \cos\left(\frac{\pi}{2}x\right)$ at the point where $x = -1$.
- -2
 - 2
 - $-2/\pi$
 - $2/\pi$
 - 0
 - None of these.

9. Give the value of dy/dx for the curve $3y + xy - x^2 + \sin(x) = 3$ at the point where $x = 0$.

- a. $-1/2$
- b. $1/2$
- c. $-4/3$
- d. $4/3$
- e. 0
- f. None of these.

10. $\lim_{x \rightarrow 0} \frac{x \cos(2x) \tan(3x)}{2x \sin(5x) \cos\left(x + \frac{\pi}{4}\right)} =$

- a. $3\sqrt{2}/10$
- b. $\sqrt{2}/5$
- c. $\sqrt{2}/6$
- d. $5\sqrt{2}/3$
- e. DNE
- f. None of these.