

NAME : _____ ID NUMBER _____

PART I consists of 12 multiple choice questions (worth 5 points each) for a total of 60 points. Mark the correct answer on the answer card. For part I only the answer on the card will be graded.

Part II consists of 4 handgraded problems (worth 10 points each) for a total of 40 points. A correct answer without supporting work may get no credit. Present a readable, orderly sequence of steps showing how you got your answer.

Part I (60 points) :

1) Find an equation for the **tangent line** to the curve $y = \sin^2(x)$ at $(\pi/4, \frac{1}{2})$.

A) $y = x$

B) $x + y = 0$

C) $2x - y = \pi$

D) $y = 3x - \pi$

E) $4x - 4y = \pi - 2$

F) $x - y = 2\pi$

G) $\pi y = x + \frac{\pi}{4}$

H) $y = \pi x + \pi$

I) $x - 2\pi y = 2$

J) $3x - 2y = 2\pi - 1$

2) Find the **slope** of the tangent line to the curve $x^3 + xy + 2y^2 = 4$ at $(1, 1)$.

A) 1 B) -1 C) 3 D) -3 E) 3 F) -5 G) $\frac{2}{3}$ H) $-\frac{4}{5}$ I) $\frac{3}{4}$ J) $-\frac{5}{2}$

3) If $f(t) = \sqrt[3]{7 + \tan(t)}$ then find $f'(\frac{\pi}{4})$.

A) 0 B) -2 C) $\frac{1}{6}$ D) $-\frac{2}{3}$ E) $\frac{3}{5}$ F) $-\frac{1}{8}$ G) $\frac{3}{4}$ H) $-\frac{4}{5}$ I) $\frac{3}{2}$ J) $-\frac{1}{2}$

4) For the curve given by the parametric equations $x = e^{\sqrt{t}}$ $y = t - t^2$,
find the value of $\frac{dy}{dx}$ at the point $(e, 0)$.

A) e B) $-e$ C) $2e$ D) $-2e$ E) $\frac{e}{2}$ F) $-\frac{e}{2}$ G) $\frac{2}{e}$ H) $-\frac{2}{e}$ I) $\frac{3e}{2}$ J) $-\frac{3e}{2}$

5) If $f(x) = \tan^{-1}(\sin(x))$ then $f'(\pi/2) =$:

- A) $\frac{\sqrt{2}}{3}$
- B) $\frac{\sqrt{3}}{2}$
- C) $\sqrt{3}$
- D) $\sqrt{2}$
- E) $\frac{1}{2}$
- F) $\frac{1}{4}$
- G) $\frac{\sqrt{2}}{9}$
- H) $\frac{1}{3}$
- I) 2
- J) 0

6) For what value of x , $-\pi/2 \leq x \leq \pi/2$, does the graph of $f(x) = x - 2 \cos(x)$ have a horizontal tangent line ?

- A) 0
- B) $\frac{\pi}{6}$
- C) $-\frac{\pi}{6}$
- D) $\frac{\pi}{4}$
- E) $-\frac{\pi}{4}$
- F) $\frac{\pi}{3}$
- G) $-\frac{\pi}{3}$
- H) $\frac{\pi}{2}$
- I) $-\frac{\pi}{2}$