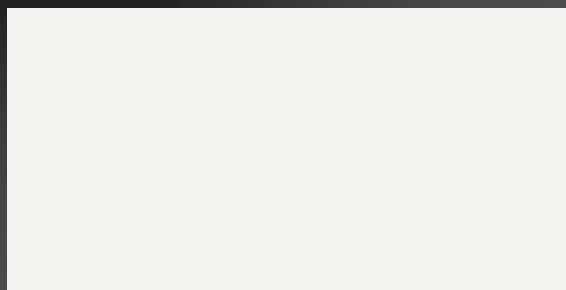


Arrival Instructions

- Divide into 2 teams (5 people vs 6 people)
- Create a Team Name
- Discuss HW Questions with group

HW Questions?



Tic-Tac-Toe Review

1. If a particle has a velocity vector of, $\langle t^2, \sin \pi t \rangle$ the acceleration at $t = 1$ is...

$$\langle 2, -\pi \rangle$$

2. Write an equation, in standard form, of the line tangent to the curve with parametric equations

$$x = 3e^{-t} \quad \text{and} \quad y = 6e^t$$

at $t = 0$

$$2x + y = 12$$

3. Which of the following is/are true about this limit statement?

$$\lim_{x \rightarrow 5} \frac{g(x) - g(5)}{x - 5} = 0$$

- A) $g(x)$ must be continuous at $x = 5$
- B) $g(5) = 0$
- C) $g'(5) = 0$
- D) There is an extrema at $x = 5$

4. In the xy plane, what would be

The equation that represents the graph described by

$$x = 2t + 4 \quad y = 4t$$

$$y = 2x - 8$$

5. A particle's position

Is described by:

$$r(t) = (\cos t)i + (t)j$$

Give its velocity at time π

$$0i + 1j \quad \text{or} \quad \langle 0, 1 \rangle$$

6. Determine any asymptotes and/or holes of the following function:

$$f(x) = \frac{x - 2}{x^2 - 4}$$

$$\text{Vertical: } x = -2$$

$$\text{Horizontal: } y = 0$$

$$\text{Hole: } x = 2$$

7. Given the points $A=(3, 5)$,

$B=(-2, 0)$, and $C=(-7, -4)$, find

$$\overrightarrow{AB} + \overrightarrow{CB}$$

$$\langle 0, -1 \rangle$$

8. Find $\frac{d^2y}{dx^2}$ for the parametric curve defined by:

$$x = e^t \quad \text{and} \quad y = \sin t$$

$$\frac{d^2y}{dx^2} = \frac{-\sin t - \cos t}{e^{2t}}$$

9. A curve in the xy plane is

defined parametrically by the equations

$$x = t^2 + t \quad \text{and} \quad y = t^2 - t$$

At what point(s) on this curve are there horizontal tangents?

$$\left(\frac{3}{4}, -\frac{1}{4} \right)$$

10. Given the points $A=(3, 5)$,

$B=(-2, 0)$, and $C=(-7, -4)$, find

and write \overrightarrow{BC} as a linear combination.

$$-5i - 4j$$

11. If a particle has a position

At any time t of

$$r(t) = (e^{-t})i + (t^2)j$$

Find its speed at $t = 0$.

$$\text{speed} = 1$$

12. A particle moves in the xy -plane so that at any time t its coordinates are

$$x = t^2 \quad \text{and} \quad y = 4 - t^3$$

What is the particle's direction when $t=1$

$$\left\langle \frac{2}{\sqrt{13}}, -\frac{3}{\sqrt{13}} \right\rangle$$

13. A particle moves in the xy -plane so that at any time t its coordinates are

$$x = t^2 \quad \text{and} \quad y = 4 - t^3$$

Find the acceleration vector:

$$\langle 2, -6t \rangle$$

14. Find the UNIT vector(s)

normal to the curve

$$x = \ln(t-1) \quad y = \ln(t)-1 \quad \text{at } t=3$$

$$\left\langle \frac{-2}{\sqrt{13}}, \frac{3}{\sqrt{13}} \right\rangle \quad \text{and} \quad \left\langle \frac{2}{\sqrt{13}}, \frac{-3}{\sqrt{13}} \right\rangle$$

15. Eliminate the parameter and

Give the equation of the curve

$$x = t^2 \text{ and } y = t + 1$$

In terms of x and y.

$$y = \pm\sqrt{x} + 1 \quad (\text{parabola})$$

or $x = (y - 1)^2$

16. Find the length of the ellipse

$$x = 3 \cos t, \quad y = 4 \sin t, \quad 0 \leq t \leq 2\pi$$

$$\int_0^{2\pi} \sqrt{(-3 \sin t)^2 + (4 \cos t)^2} dt$$

$$= 22.103$$

17. Find the component form of

vector $-4\overrightarrow{AB}$

if $A = (-2, 4)$ and $B = (5, 3)$

$$\langle -28, 4 \rangle$$

18. Integrate:

$$\int_0^{\pi/4} \tan x \sec^2 x \, dx$$

$$\frac{1}{2}$$

19. Two particles move in the xy-plane according to the equations

$$x = t - 2 \quad \text{and} \quad y = (t - 2)^2$$

Set up an integral that gives the distance traveled by the particle from $t = 0$ to $t = 3$.

$$D = \int_0^3 \sqrt{1^2 + (2t - 4)^2} dt$$

20. A particle move in the xy-plane according to the equations

$$x = t - 2 \quad \text{and} \quad y = (t - 2)^2$$

Find the *point(s)* where the particle has vertical and horizontal tangents.

No Vertical Tangents

Horizontal Tangent at $t = 2$ $(0, 0)$

Reminders

- Test TOMORROW
 - 72 minutes for 4 sections
 - Includes review of AB Topics
 - Study Guide on Edmodo
 - Tutoring after school today
- Unit HW Packet due tomorrow