

MTH-301 Quiz File

By Knowledge for us

Attia

1. What is the arc length of the curve $r(t) = \frac{1}{3}t^3i + tj$ from $t=1$ to $t=3$?

Answer: $\int_1^3 (1+t^2)^2 dt$

A single curve can be represented by:

Answer: Only two vector-valued function

The differential equation, $dz = (2x^2 + 2xy + 3)dx + (6y^2 + 2x^2 + 1)dy$, is an exact differential equation.

Answer: false

If r is a vector-valued function in 2-space or 3-space, then

Answer:

$r(t)$

5. If $r(t) = ti + 2tj$, then $\frac{d}{dt} |r(t)| =$

Answer: $\frac{1}{2}$

$2j$

6. The arc length of the rotation of the circular helix where $(dx/dt) = -\sin t$, $(dy/dt) = \cos t$ and $(dz/dt) = 1$ and $0 \leq t \leq \pi$, then the arc length is

$$\sqrt{2}$$

7. For a vector valued function $r(t) = 2t i + (t-1)j$ then length of $r(t)$

Answer: $\|r(t)\| = \sqrt{4t^2 + (t-1)^2}$

8. For a vector valued function $r(t) = \sqrt{2}t i + (t-1)j$ then length of $r(t)$.

Answer: $\|r(t)\| = \sqrt{2t^2 + (t-1)^2}$

9. Let $r(t) = 2t^2 i + 3t^3 j$, then $r'(1) = 4j + 9i$.

Answer: True

- Natural domain of a vector valued function is .

Answer: intersection of the natural domains of its components.

- If $x'(t)$, $y'(t)$ and $z'(t)$ are continuous for $a \leq t \leq b$, then the arc length for the given parametric equations $x = x(t)$, $y = y(t)$, $z = z(t)$; ($a \leq t \leq b$) is .

Answer: $L = \int_a^b \sqrt{(dx/dt)^2 + (dy/dt)^2 + (dz/dt)^2} dt$

12. The differential dz of the function $z = x^2 + y^2$ is: $dz = 2x dx + 2y dy$

Answer: $dz = 2x dx + 2y dy$

13. A vector-valued function is continuous at some point if:

Answer: each of its components is continuous at that point.

14. If $\vec{r}(t) = t^2 \vec{i} + t^3 \vec{j} + 3t \vec{k}$, then $\frac{d}{dt} \|\vec{r}(t)\| = \text{---}$

$\vec{r}(t) = t^2 \vec{i} + t^3 \vec{j} + 3t \vec{k}$, then

$\frac{d}{dt} \|\vec{r}(t)\| = \text{---}$

Answer: $2t \vec{i} + 3t^2 \vec{j} + 3 \vec{k}$

15. If $\vec{r}(t) = 3t^2 \vec{i} + 2t \vec{j}$, then $\int_C \vec{r}(t) dt =$

Answer: $t^3 \vec{i} + t^2 \vec{j}$

- The differential equation, $dz = 4xydx + (2x^2 + 3y^2)dy$, is an exact differential equation.

Answer: False

- If $x'(t)$ and $y'(t)$ are continuous for $a \leq t \leq b$, then the given parametric equation are:

Answer: $x = x(t), y = y(t); (a \leq t \leq b)$

- Equation of the tangent line of vector valued function $\vec{r}(t)$ at $\vec{r}(t_0)$ is:

Answer: $\vec{r} = \vec{r}(t_0) + t \vec{r}'(t_0)$

- The differential equation $dz = 8ydx + 8xdy$ is an exact differential equation.

Answer: True.