MTH-301 Quiz File

By Knowledge for us

Attiq Kundi

KNOWLEDGE FOR US

1. Which integral gives the arc length of the curve?

$r(t)=\frac{1}{3}t^3i+tj+t^2k$

Answer: $\int_1^3\sqrt{(1+t^2)^2}\,dt$

2. A single curve can be represented by:

Answer: Only two vector-valued function

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

Answer: False

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

$\frac{d}{dt}\left[\int r(t)dt\right]$

Answer: $r(t)$

5. **If** $\vec{r}(t)=t\hat{i}+2t\hat{j},then\frac{d}{dt}\left[\vec{r}(t)\right]=---$

Answer: $\hat{i}+2\hat{j}$

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

Answer: $L = \int_0^{\pi} \sqrt{2}dy$

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

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

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

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

9. Let $\vec{r}(t) = 2t^2\,\hat{i} + 3t^3\,\hat{j}$, then $\vec{r}(1) = 4\hat{i} + 9\hat{j}$.

Answer: True

10. Natural domain of a vector valued function is_____.

Answer: intersection of the natural domains of its components.

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

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

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

Answer: $dz = 2xdx + 2ydy$

13. A vector-valued function is continuous at some point 10 if:

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

KNOWLEDGE FOR US

14. If $\vec{r}(t) = t^2\,\hat{i} + t\,\hat{j} + 3t\,\hat{k}, then\ \frac{d}{dt}\left[\vec{r}(t)\right] = ----$

Answer: $2t\,\hat{i} + \hat{j} + 3\hat{k}$

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

Answer: $t^3\,\hat{i} + t^2\,\hat{j} + C_2\,\hat{j}$

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

Answer: False

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

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

18. Equation of the tangent line of vector valued function $r(t)$ at $r(t_0)$ is:

Answer: $r = r(t_0) + t$

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

Answer: True.

KNOWLEDGE FOR US