MA225C Mock Test 1

Name: _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) The vector $\langle 1/5, 2/5, 2/5\rangle$ is a unit vector. 1) _____

2) Two vectors $\vec{v}$ and $\vec{w}$ are parallel if $\vec{v} \cdot \vec{w} = \vec{0}$. 2) _____

3) The surface $z = x^2+y^2$ is an ellipsoid. 3) _____

4) If two planes $ax + by + cz = d$ and $Ax + By + Cz = D$ are parallel, hen $a = A, b = B$, and $c = C$. 4) _____

5) Every point on the parametric curve $r(t) = (t,t^2,-t)$ lies on the surface $xz + y = 0$. 5) _____

6) $\text{Proj}_{\vec{u}} \vec{v} = \text{Proj}_{\vec{v}} \vec{u}$ for all vectors $\vec{u}$ and $\vec{v}$. 6) _____

7) The curvature of the curves $r(t) = (t,t^2,t^3)$ and $R(t) = (t^2,t^4,t^6)$ are the same at $t=1$. 7) _____

8) The volume of the parallelepiped spanned by the vectors $\langle 1,0,0\rangle, \langle 0,2,0\rangle$ and $\langle 1,1,1\rangle$ is 2. 8) _____

9) The vector $\langle -5,4,1\rangle$ is parallel to the plane $-5x + 4y + z = 2$. 9) _____

10) There are vectors $\vec{u}$ and $\vec{v}$ such that $\vec{u} \cdot \vec{v} = \|\vec{u} \times \vec{v}\|$. 10) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The position vector of a particle is r(t). Find the requested vector.

11) The velocity at $t = 1$ for $r(t) = (2 - 4t^2)i + (6t + 5)j - e^{-6t}k$ 11) _____

A) $v(1) = 8i + 6j + 6e^{-6}k$ B) $v(1) = -8i + 6j + 6e^{-6}k$

C) $v(1) = -4i + 6j + 6e^{-6}k$ D) $v(1) = -8i + 6j - 6e^{-6}k$

12) The acceleration at $t = 1$ for $r(t) = (3t - 2t^4)i + (2 - t)j + (6t^2 - 7t)k$ 12) _____

A) $a(1) = 24i + 12k$ B) $a(1) = -6i + 12k$

C) $a(1) = -24i - j + 12k$ D) $a(1) = -24i + 12k$

For the smooth curve r(t), find the parametric equations for the line that is tangent to r at the given parameter value $t = t_0$.

13) $r(t) = (6 \sin t)i - (9 \cos 3t)j + e^{-10t}k$; $t_0 = 0$ 13) _____

A) $x = 6t, y = -9, z = 1 - 10t$ B) $x = 6t, y = 9, z = 1 + t$

C) $x = 6, y = -9t, z = -10 + t$ D) $x = 6t, y = -9, z = 1 - t$

Find the arc length parameter along the curve from the point where t = 0 by evaluating $s = \int_0^t |v(\tau)|\, d\tau$.

14) r(t) = (4cos t)i + (4sin t)j + 5tk 14) _____

A) $\sqrt{57}t$ B) $\sqrt{66}t$ C) $\frac{\sqrt{41}}{2}t$ D) $\sqrt{41}t$

SHORT QUESTIONS.

15) Parametrize the following surfaces.

a) $x^2 + y^2 = z^2 + 1$.

b) $x^2 + 2y^2 + 4z^2 = 4$.

c) $z = e^y (\sin x)$.

d) $x + y + z = 4$.