



AEW Worksheet 2
Ave Kludze (akk86)
MATH 1920

Name: _____

Collaborators: _____

1

Determine if the following statements are true(T) or false(F). Mark the correct answer. No justification needed.

- (a) ☐ T ☐ F For any $\mathbf{u}, \mathbf{v}, \mathbf{w} \in \mathbb{R}^3$, $\mathbf{u} \cdot (\mathbf{v} \times \mathbf{w}) = (\mathbf{u} \times \mathbf{v}) \cdot \mathbf{w}$.
- (b) ☐ T ☐ F For any $\mathbf{u}, \mathbf{v}, \mathbf{w} \in \mathbb{R}^3$, $\mathbf{u} \times (\mathbf{v} \times \mathbf{w}) = (\mathbf{u} \times \mathbf{v}) \times \mathbf{w}$

2 (Challenge)

Write the spherical equation in rectangular coordinates. Sketch the surface given by the equation. Include sufficient detail, such as coordinate axes and some indication of scale.

$$\rho \cos(2\phi) = -6 \cos\left(\frac{\pi}{2} - \phi\right) \left(\sin\left(\frac{\pi}{2} - \theta\right) + \cos\left(\frac{\pi}{2} - \theta\right)\right) + 19\rho^{-1}$$

3

A particle moving in three space has acceleration

$$\mathbf{a}(t) = \langle 2, \sin(\pi t), 6t \rangle$$

At time $t = 0$ the particle is at $\langle 3, 0, 1 \rangle$ while at time $t = 2$ the particle is at $\langle 1, -2, 5 \rangle$. What is the velocity of the particle at time $t = 1$?

4

Sketch by hand the curve of intersection of $x^2 + y^2 = 4$ and the $z = x^2$ and find parametric equations for this curve.

5

Find the point on the plane $x + 2y = 5 + 3z$ which is closest to the point $(4, 4, -7)$.

Hint: You do not need calculus to find the answer, use your visual intuition.