

Math 2A – Chapter 9 Test – Fall '07 Name: _____

Show your work for credit. No calculators are needed.

- Let $\vec{v} = \langle 2, 3, 6 \rangle$. Find two unit vectors parallel to \vec{v} .
- What work is done by the force vector $\vec{F} = \langle 1, 2, 3 \rangle$ in moving an object from the origin to $(2, 3, 4)$? Assume the force is measured in Newtons and the distances are measured in meters.
- Find the angle between the vectors \overrightarrow{OP} and \overrightarrow{OQ} where the coordinates are O $0, 0, 0$ P $2, 0, 0$, and Q $2, 1, 1$.
- Find the distance between the plane $x - 2y + 4z = 0$ and the plane $x - 2y + 4z = 7$.
- Find an equation for the plane S containing the x -axis and passing through the point $P(1, 2, 3)$.
- Consider the quadric surface described by the equation $2x^2 - 4x + y^2 + z^2 + 4 = 0$
 - Write the equation in standard form
 - Identify the surface as one of the following: a hyperbolic paraboloid, an elliptical cone, an elliptical paraboloid, an ellipsoid, a hyperboloid of one sheet or a hyperboloid of two sheets.
 - What is the intersection of the surface with the plane $x = 2$?
- Find the magnitude of the torque vector at P if a 20 Newton force is applied to the rigid body shown in the diagram at right. Note that this is a planar diagram. Recall that $|\vec{\tau}| = |\vec{r}||\vec{F}|\sin\theta$ where \vec{r} is the lever arm vector \vec{F} is the force vector and θ is the angle between them.
- Describe the cross section that the given plane makes with the surface $z = x^2 - 4y^2$
 - $z = 9$
 - $x = 2y$
- The spherical coordinates of a point are $\rho, \theta, \phi = \left(2, \frac{7\pi}{6}, -\frac{\pi}{4}\right)$
 - What are the rectangular coordinates?
 - What are the cylindrical coordinates?
- Write the equation $x^2 + y^2 = 4y$
 - Using cylindrical coordinates.
 - Using spherical coordinates.

