SHOW ORGANIZED & PROPER WORK & SIMPLIFY YOUR FINAL ANSWER TO RECEIVE FULL CREDIT

- Sign below to confirm that the work shown on this quiz is strictly your own work.
 - You may have consulted your textbook, your notes and the class handouts, and used your calculator,
 - but you did NOT consult other people, websites, software or other outside sources of help.

SIGNATURE:

Find the center and radius of the sphere $x^2 + y^2 + z^2 - 8x + 10y - 6z + 2 = 0$. SCORE: ____/ 3 PTS

Consider the vector $\vec{m} = 3\vec{i} - 2\vec{j}$.

[a] Find a unit vector perpendicular to \vec{m} .

[b] Find the direction angle of \vec{m} . (Your answer should be in radians.)

Consider the vectors $\vec{f} = 3\vec{i} - 2\vec{k}$ and $\vec{g} = -4\vec{j} + \vec{k}$.

[a] Find the angle between \vec{f} and \vec{g} . (Your answer should be in radians.)

[b] Find a unit vector perpendicular to both \vec{f} and \vec{g} .

[c] Write \vec{f} as the sum of 2 vectors, one parallel to \vec{g} and one perpendicular to \vec{g} .

SCORE: ____/ 4 PTS

SCORE: ____ / 9 PTS

Let P be the point (-2, -4, 1). Let Q be the point (3, -2, -1). Let R be the point (-1, -3, -2). SCORE: ____/ 19 PTS Let \vec{u} be the vector with initial point Q and terminal point P. Let \vec{w} be the vector with initial point R and terminal point P.

- [a] What octant is R in ?
- [b] Write \vec{u} in component form.
- [c] Write \vec{w} as a linear combination of \vec{i} , \vec{j} and \vec{k} .
- [d] Find the magnitude of \vec{w} .
- [e] Find a unit vector in the opposite direction as \vec{u} .
- [f] Find a vector of magnitude 4 in the same direction as \vec{w} .
- [g] Find the area of triangle PQR.

- [h] Find the general equation of the plane passing through P, Q and R.
- [i] Find parametric equations for the line which passes through R and is also parallel to \vec{u} .
- [j] Find symmetric equations for the line which passes through Q and is also perpendicular to the plane -x + 5y 7z = 9.