Math 211 More Practice with Vectors

1. Find the center and radius of the sphere $x^2 + y^2 + z^2 + 4x + 6y - 10z + 2 = 0$.

2. Find two unit vectors perpendicular to the vector $\mathbf{v} = \langle -2, 3 \rangle$.

3. Find two unit vectors parallel to the curve $y = x^3 - 2x$ at the point (2,4).
4. Let \( \mathbf{u} = (1, -1) \) and \( \mathbf{v} = (-2, 3) \).

a) Find the angle of intersection of these two vectors.

b) Find the projection of \( \mathbf{u} \) onto \( \mathbf{v} \).

c) Find the projection of \( \mathbf{v} \) onto \( \mathbf{u} \).

d) If \( a\mathbf{u} + b\mathbf{v} = (12, -17) \), what are \( a \) and \( b \)?