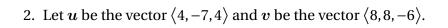
Math253 Multivariable Calculus

First Midterm Exam

Colorado Mesa University \cdot 2025 Fall

Name:
1. Let P be the point $(4, -7, 4)$.
(a) How far is the point <i>P</i> from the origin?
(b) How far is the point <i>P</i> from the <i>xz</i> -plane?
(c) How far is the point <i>P</i> from the <i>y</i> -axis?
(d) What are the spherical coordinates of the point P ?





(a) What is \hat{u} , the unit vector in the direction of u?

(b) What is the measure of the angle between u and v?

(c) What the projection of \boldsymbol{v} onto \boldsymbol{u} expressed explicitly in terms of its components?



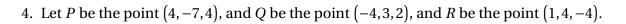
3.	Let <i>P</i> be the	noint (4. –7	.4) and () be the	noint ((-4,3,2)
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(a) How far is the point P from the point Q?

(b) What is a parameterization or vector equation of the line that passes through *P* and *Q*?

(c) What is the shortest distance from the origin to the line that passes through *P* and *Q*?





(a) What is the area of the triangle with vertices located at *P* and *Q* and *R*?

(b) What is an equation for the plane that contains P and Q and R? Express the equation in the form Ax + By + Cz = D for constants A, B, C, and D that don't share a common divisor.

(c) What is a parameterization of the line along which the plane that contains P and Q and R intersects the xy-plane?

