Engr221  Mid-term Test #1

30 Points Possible

NAME_________________________

NOTES: Calculator and one sheet (8½” x 11”) of private reference allowed.
Show all work and state all assumptions. SCORE __________/ 30

1 point each. Circle the correct answer.

T or F  A position vector always has a positive magnitude.

T or F  The result of a dot product operation is a vector.

T or F  A unit vector is dimensionless.

The coordinates of points A and B are:  
\[ A = (1,2,-6) \text{ ft} \quad \text{and} \quad B = (-6,-1,4) \text{ ft} \]

4 pts  Find the distance between points A and B.

3 pts  If points A and B are referenced from the origin, find the angle between them.
10 pts  The force $F$ has a magnitude of 80 lb and acts at the midpoint $C$ of the thin rod. Express the force as a Cartesian vector. Then, find its coordinate direction angles.
10 pts  If the bucket and its contents have a total weight of 20 lb, determine the force in the supporting cables $DA$, $DB$, and $DC$. 