

# MIDTERM 1

**Time:** 50min

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1. Determine whether or not  $(2, 1, 6)$ ,  $(4, 7, 9)$ , and  $(8, 5, -6)$  form the vertices of a right triangle.
2. Find  $\mathbf{r}(t)$  if  $\mathbf{a}(t) = (0, -32)$ ,  $\mathbf{v}(0) = (0, 0)$ , and  $\mathbf{r}(0) = (0, 1)$ .
3. Find equation of the plane through  $(-1, 2, -3)$  and parallel to the plane  $2x + 4y - z = 6$ .
4. Show that if the speed of a parametric curve is constant, then its velocity and acceleration vectors are perpendicular.
5. Show that the diagonals of a rhombus are perpendicular.

*Each problem is worth 20 points*