

1. At time  $t$ , the position of an object moving with constant velocity is given by the parametric equations  $x = 1 + 5t$  and  $Y = -1 + 12t$ 
  - a.) Find the velocity and the speed of the object
  
  
  
  
  
  
  
  
  
  
  - b.) Where and when does the object cross the line  $2x - y = 5$ ?
  
2. Given  $A(0,0)$ ,  $B(4, 3)$  and  $C(1, -2)$  find the approximate measure of angle  $BAC$ .
  
  
  
  
  
  
  
  
  
  
3. Find a vector equation of a line through  $(-3, -1)$  and parallel to the line  $(x,y) = (2, 7) + t(1, 5)$ .
  
  
  
  
  
  
  
  
  
  
4. If  $u = (5, 7, -3)$  and  $v = (-2, -4, 0)$ , find  $u \cdot v$ .
  
  
  
  
  
  
  
  
  
  
5. Find  $\|\overrightarrow{AB}\|$ , if  $A(4, -3, -1)$  and  $B(0, 1, -1)$ .

6. if  $A = (8, -5, 7)$  and  $B = (3, 4, 9)$
- a.) Find the midpoint of segment  $AB$
- b.) Determine  $\overrightarrow{AB}$  then find  $\|\overrightarrow{AB}\|$ .
7. Find a vector and parametric equations for the line containing  $A (5, -2, 4)$  and  $B (6, 1, 1)$ .
8. Find the measure of the angle between the vectors  $(1, 0, -1)$  and  $(3, -5, -4)$ .
9. Line  $L$  has a vector equation  $(x, y, z) = (3, -4, -2) + t(-1, 1, 5)$
- a.) Name two points on  $L$ .
- b.) Write a vector equation through  $(-1, 0, 7)$  and parallel to  $L$ .
- c.) Is the line with vector equation  $(x, y, z) = (3, -4, -2) + t(2, 5, -2)$  perpendicular to the original line? Explain.

10. Solve the system using Cramer's rule. You must show your work.  
 $5x + 3y = 8$   
 $2x + y = 4$
11. Find the area of a triangle with vertices P (5, 1) Q(8, -3) and R (7, -5).
12. Solve the system using Cramer's Rule  
 $x + 3y - z = 8$   
 $2x + y + 4z = -12$   
 $-x - 5y + 2z = 0$
13. Find the value of a if the vectors (6, -10) and (4, a) are  
a.) parallel    b.) perpendicular
14. The three vectors  $\mathbf{u} = (4, 5, 7)$ ;  $\mathbf{w} = (2, -1, 4)$  and  $\mathbf{q} = (-3, 5, 2)$  determine a 3D parallelogram called a parallelepiped. Find the volume.

