**Unity University**

**Work Sheet One**

**Department of Computer Science Linear Algebra (Math 2022)**

1. Determine which of the following vectors are equal:

u1= ( 1 , 2 , 3 ) u2= ( 2 , 1 , 3 ) u3= ( 2 , 1 , 3 ) u3= ( 1, 2 , 3 )

1. Let u = (2 , - 7 , 1 ) , v = (- 3 , 0 , 4), w = (0, 5 , - 8 ) , Find:
2. 3u - 4v + 4w b. 2u + 3v - 5w c. 2v - 3v - 5w
3. Let u = , v = , w = find :
4. 5u - 2v, b. -2u + 4v - 3w.
5. Find the values of x and y, where: (a) (x, 3) = (2 , x + y), (b) (4 , y) = x(2 , 3 )
6. Find u · v where:
7. u = (2, -5, 6) and v = (8, 2, -3)
8. u = (4, 2, -3 , 5 , - 1 ) and v = (2, 6, - 1 , -4, 8).
9. Let u = (5 , 4 , 1 ) , v = (3 , -4, 1), W = ( 1 , - 2 , 3 ) . Which pair of vectors, if any, are perpendicular(orthogonal)?
10. Find k so that u and v are orthogonal, where:
11. u = (1 , k, -3) and v = (2, -5, 4)
12. u = (2, 3k, -4, 1 , 5) and v = (6, - 1 , 3 , 7, 2k)
13. Find || u || , where: (a) u = (3 , - 1 2 , -4), (b) u = (2 , - 3 , 8 , -7).
14. Normalize a nonzero vectors:
15. u = (3 , -4), b. v = (4, -2, -3 , 8), c. w = (, , -)
16. Let u = ( 1 , - 3 , 4) and v = (3 , 4 , 7). Find
17. , where is the angle between u and v;
18. proj(u, v), the projection of u onto v;
19. d(u, v), the distance between u and v.
20. Find an equation of the hyperplane H in R4 that passes through P(3 , -4, 1 , -2) and is normal to u = [2 , 5 , - 6 , - 3 ] .
21. Find a parametric representation of the line L in R4 passing through P(4, - 2 ,3 , 1) in the direction of u = [2 , 5 , - 7 , 8].
22. Let u = 2i - 3j + 4k, v = 3i + j - 2k, w = i + 5j + 3k. Find:
23. u + v, c. 2u - 3v + 4w,
24. u · v and u . w, d. ||u || and || v ||.

Treat the coefficients of i, j, k just like the components of a vector in R3

1. Let u = 2i - 3j + 4k , v = 3i + j - 2k , w = i + 5j + 3 k . Find:
2. u x v b. u x w c. v x w
3. Given u = 3i - 4j + 2k, v = 2i + 5j - 3k, w = 4i + 7j + 2k, Find:

(a) u x v, (b) u x w, (c) v x w.

1. Find u x v, where:
2. u = (1 ,2, 3), v = (4 , 5, 6); b. u = (-4, 7 , 3), v = (6 , - 5 , 2).
3. Find a unit vector u orthogonal to v = [ 1 , 3 , 4] and w = [2 , -6, -5].
4. Suppose z = 5 + 3i and w = 2 - 4i. Find: (a) z + w, (b) z - w, (c) zw.
5. Simplify: (a) (5 + 3i)(2 - 7i), (b) (4 - 3i)2, (c) ( 1 + 2i)3.
6. Find the complex conjugate of each o f the following:
7. 6 + 4i, 7 - 5i, 4 + i, -3 - i, b. 6, -3, 4i, -9i.
8. Find z and |z| when z = 3 + 4i.
9. Simplify
10. Find u · v and v · u where: (a) u = ( 1 - 2i, 3 + i), v = (4 + 2i, 5 - 6i),

b. u = (3 - 2i, 4i, 1 + 6i), v = (5 + i, 2 - 3i, 7 + 2i)

24. Find a unit vector u orthogonal to:

a. v = [ 1 , 2, 3] and w = [ 1 , - 1 , 2]; b. v = 3i - j + 2k and w = 4i - 2j - k.