**Home Work 2**

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*Due date*: **Phalgun 27, 2080**

1. Find *a* and *b* that solve the vector equation.

+ = .

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+ = .

3. Solve the given vector equation for *x*, or explain why no solution exists:

+ = .

4. Solve the given vector equation for *a*, or explain why no solution exists:

+ = .

5. Solve the given vector equation for *a*, or explain why no solution exists:

+ = .

6. Let **u** = (-3, 2, 1, 0) and **v** = (3,1,4,−5), find

a. ||**u||**

b.

c. ||**u** – **v||**

7. For **u** = −5e1+3e2and **v** = −6e1−2e2, find **u** ⋅ **v**.

8. Find the unit vector associated with **u** = 5 e1+2 e2.

9. Let**u** = (4,7,-3,2) and**v** = (5,−2,8,1)*.*

a. Find 6(2**u**− **v**). b. Find ||**u**+ **v||** . c. Find **u** ⋅ **v**.

d. Find e. Find ||||

f. Show that ||**u**+ **v||** ≤ ||**u||** + ||**v||** .

g. Show that ||**u**+ **v||2** ≠ ||**u|| 2**+ ||**v||** 2.

h. Find a vector **x** such that 5**x** −2**v** = 2(**u**−5**x**).

i. Find (6**u**) ⋅ **v**.

10. Find the scalar product of the vectors x = (1, 2, 3) and y = (– 3, – 2, 5).

11. Let S and T be matrix transformations defined by S(y) = Ay and T(x) = Bx, where

and

(a) What are the domains and codomains of S and T? Why is the composite

transformation S ◦ T defined? What are the domain and the codomain of S ◦ T?

(b) Let *x* = . Determine T(x).

(c) Find (S ◦ T)(x).

(d) Find a matrix C so that (S ◦ T)(x) = Cx.

(e) Why is it reasonable to define AB to be the matrix C. Does the matrix C agree with the AB.

(f) Show that S, T and S ◦ T are linear.