Name: _____

Vectors and Dot Products

Exercise 1: Find the dot product of u and v.

1) $u = \langle 6,1 \rangle, v = \langle -2,3 \rangle$

2) $u = \langle 3,2 \rangle, v = \langle -2,-1 \rangle$

3) $u = \langle 0,4 \rangle, v = \langle 5,0 \rangle$

4) $u = \langle -3,4 \rangle, v = \langle -4,3 \rangle$

5) $u = \langle 7,4 \rangle, v = \langle 8,-3 \rangle$

6) $u = \langle 3,-2 \rangle, v = \langle -10,9 \rangle$

7) $u = \langle \sqrt{2}, \sqrt{5} \rangle, v = \langle -2\sqrt{2}, 6\sqrt{5} \rangle$

8) $u = \langle \sqrt{5}, \sqrt{2} \rangle, v = \langle 3\sqrt{5}, 5\sqrt{2} \rangle$

Exercise 2: Let $a = \langle 1,3 \rangle, b = \langle 2,0 \rangle$ and $c = \langle 4,-2 \rangle$, Find:

1) a • b

2) b • a

3) a • (2b + 3c)

4) 2a • b + 3a • c

5) 2b • 5c

6) (a − b) • b

7) 10b • c

8) a • b − b • b

Exercise 3: Use the vectors $u = \langle 3,3 \rangle, v = \langle -3,4 \rangle$ and $w = \langle 1,-2 \rangle$ to find the indicated quantity. State whether the result is a vector or a scalar.

1) $u \bullet u$

2) $3u \bullet v$

3) $(u \bullet v)v$

4) $(v \bullet u)w$

5) $(u \bullet v) - (u \bullet w)$

6) $2 - \|u\|$

7) $\|w\| - 4$

8) $(3w \bullet v)u$