MATH 150 Pre-Calculus, Week In Review

Fall, 2014, Problem Set 11 (9A, 9B, 9C, 9D, 9E)

JoungDong Kim

1. If a vector starts at the point $(3, -7)$ and terminates at the point $(14, 5)$, what is the tangent of the angle this vector makes with the positive x axis?

2. A flea is on a cat. If the cat goes 5 feet in a direction $30°$ (measured counter clockwise from the positive x axis) and the flea then gets off the cat and goes 1 foot in a direction of $90°$ with respect to the positive x axis, what are the locations of the flea and the cat?

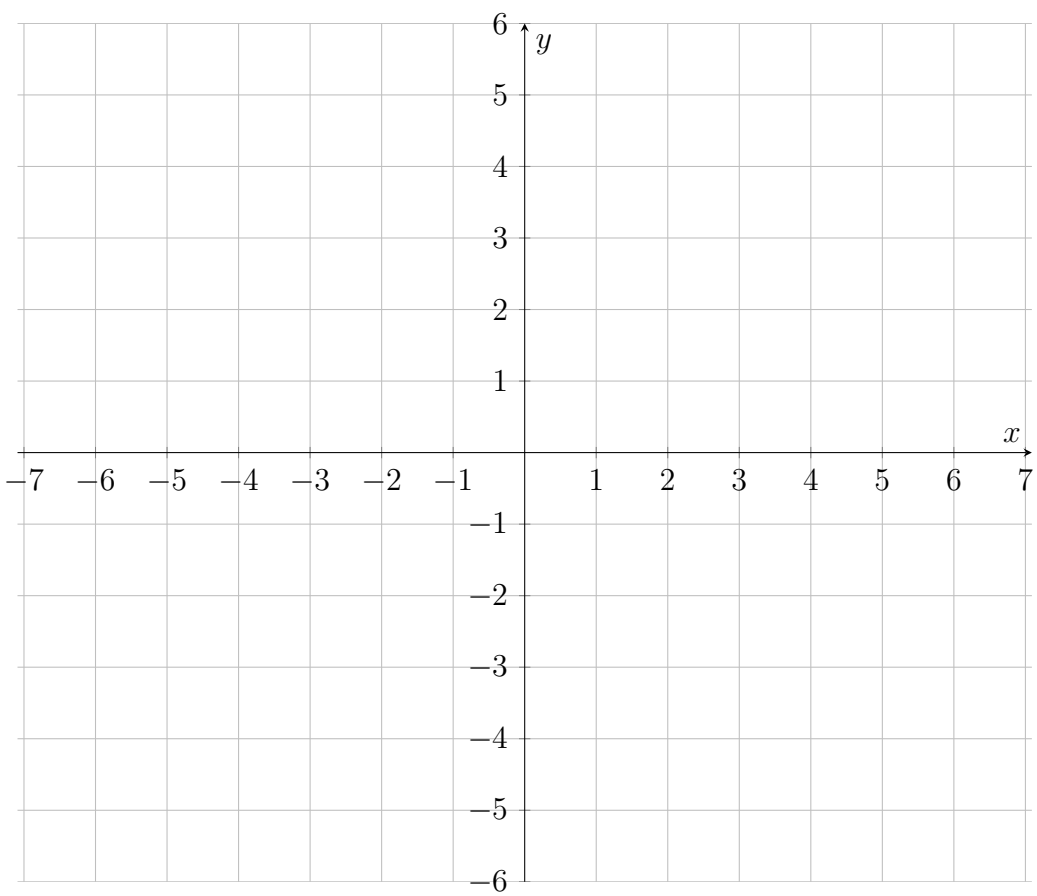
3. If the product of a vector $\mathbf{x}$ with the number 3 is equal to $\langle 4, 15 \rangle$, what is $\mathbf{x}$?

4. Find a which satisfies $a \langle 3, 4 \rangle = \langle -15, -20 \rangle$.

5. For each of the following draw the vector, and then draw the result of the scalar product.

   (a) $2 \langle -1, -1 \rangle$

   (b) $-3 \langle -1, 2 \rangle$

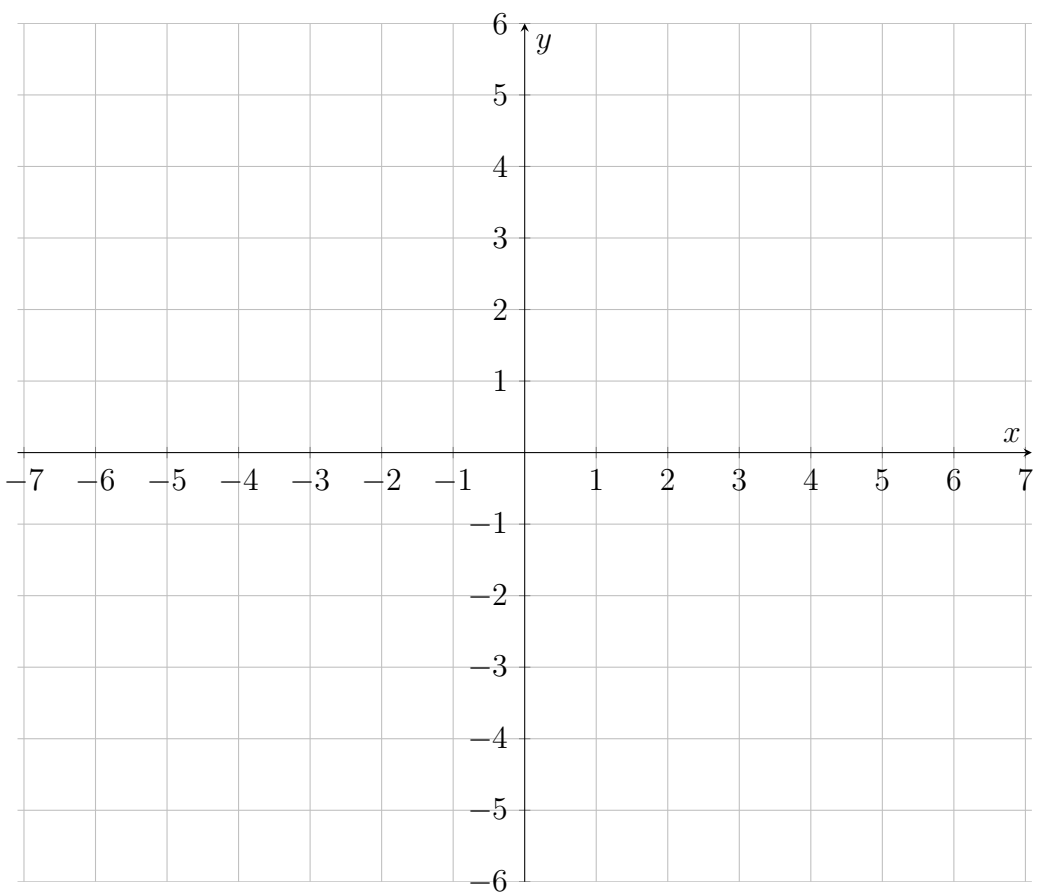


6. Find all vector $\mathbf{x}$ which satisfy the vector equation $2\mathbf{x} + 5\langle 1, -2, 4\rangle = \langle 5, 12, 17\rangle$.

7. For each of the following draw the individual vectors, and then draw the result of the vector addition.

   (a) $\langle 1, -1\rangle + \langle 2, 5\rangle$

   (b) $\langle -1, 2\rangle - \langle -2, -3\rangle$



8. For each of the following pairs $\mathbf{x}$ and $\mathbf{y}$ compute $2\mathbf{x} + 3\mathbf{y}$.

   (a) $\mathbf{x} = \langle 1, 2 \rangle\,,\ \mathbf{y} = \langle -1, 2 \rangle$

   (b) $\mathbf{x} = \langle -3, 2, 5 \rangle\,,\ \mathbf{y} = \langle 5, 1, -4 \rangle$

9. Compute the lengths of the following vectors.

   (a) $\langle 2, 3 \rangle$

   (b) $\langle 2, 3, -5 \rangle$

10. An airplane flies from the point $(1, 1, 3)$ to the point $(5, -5, 0.1)$. Once again the unit distance is one mile. If it takes the plane 4 minutes to make this descent, how fast is the plane descending in miles per hour?

11. For each of the vectors given, find a unit vector which points in the same direction as the vector.

    (a) $\langle 1, 2 \rangle$

    (b) $\langle 2, 3, -5 \rangle$

12. Compute the dot product for the following pairs of vectors.

    (a) $\langle 1, 2 \rangle\,, \;\; \langle 3, -7 \rangle$

    (b) $\langle 2, 14, 5 \rangle\,, \;\; \langle -2, 0, 7 \rangle$

13. Find all unit vectors that are perpendicular to the vector $\langle 2, -3 \rangle$.

14. Find the angle between the following pairs of vectors.

(a) $\langle 1, 1 \rangle$, $\langle 9, -4 \rangle$

(b) $\langle 2, 3, -8 \rangle$, $\langle 2, 2, 13 \rangle$