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## 7. Practice with hidden dot products and perpendicular vectors

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Lecture due Aug 18, 2021 20:30 IST Completed



## Practice

## Hidden dot products 1

1.0/1 point (graded)

Find a vector  $\langle a, b \rangle$  that is perpendicular to the line  $y = 3x$ .(Enter the vector in the form  $[a, b]$ . That is surround your vector by square brackets, and separate entries by a comma. Note that the entries of your vector must be numbers.)✓ Answer:  $[3, -1]$ 

## Solution:

The equation  $y = 3x$  can be written as a hidden dot product:

$$\langle 3, -1 \rangle \cdot \langle x, y \rangle = 0.$$

Therefore, the vector  $\langle 3, -1 \rangle$  is perpendicular to every point on the line  $y = 3x$ . Any scalar multiple of this vector is also correct!

You have used 2 of 4 attempts

**i** Answers are displayed within the problem

## Hidden dot products 2

1/1 point (graded)

Find the equation for the line through the origin that is perpendicular to the vector  $\langle -1, 4 \rangle$ .(Enter the equation in the form  $ax + by = 0$ . Note that the  $0 =$  is provided for you, so you only enter an expression of the form  $a*y+b*x$ ) $= 0$  ✓ Answer:  $-x + 4y$ 

## Solution:

The line perpendicular to the vector  $\langle -1, 4 \rangle$  satisfies the dot product equation

$$\langle -1, 4 \rangle \cdot \langle x, y \rangle = 0$$

Expanding this dot product, we obtain the equation for the line perpendicular to the given vector:

$$\langle -1, 4 \rangle \cdot \langle x, y \rangle = -x + 4y = 0.$$

You have used 0 of 4 attempts

**i** Answers are displayed within the problem

## 7. Practice with hidden dot products and perpendicular vectors

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