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2.4.4 Rotations and Reflections, Revisited

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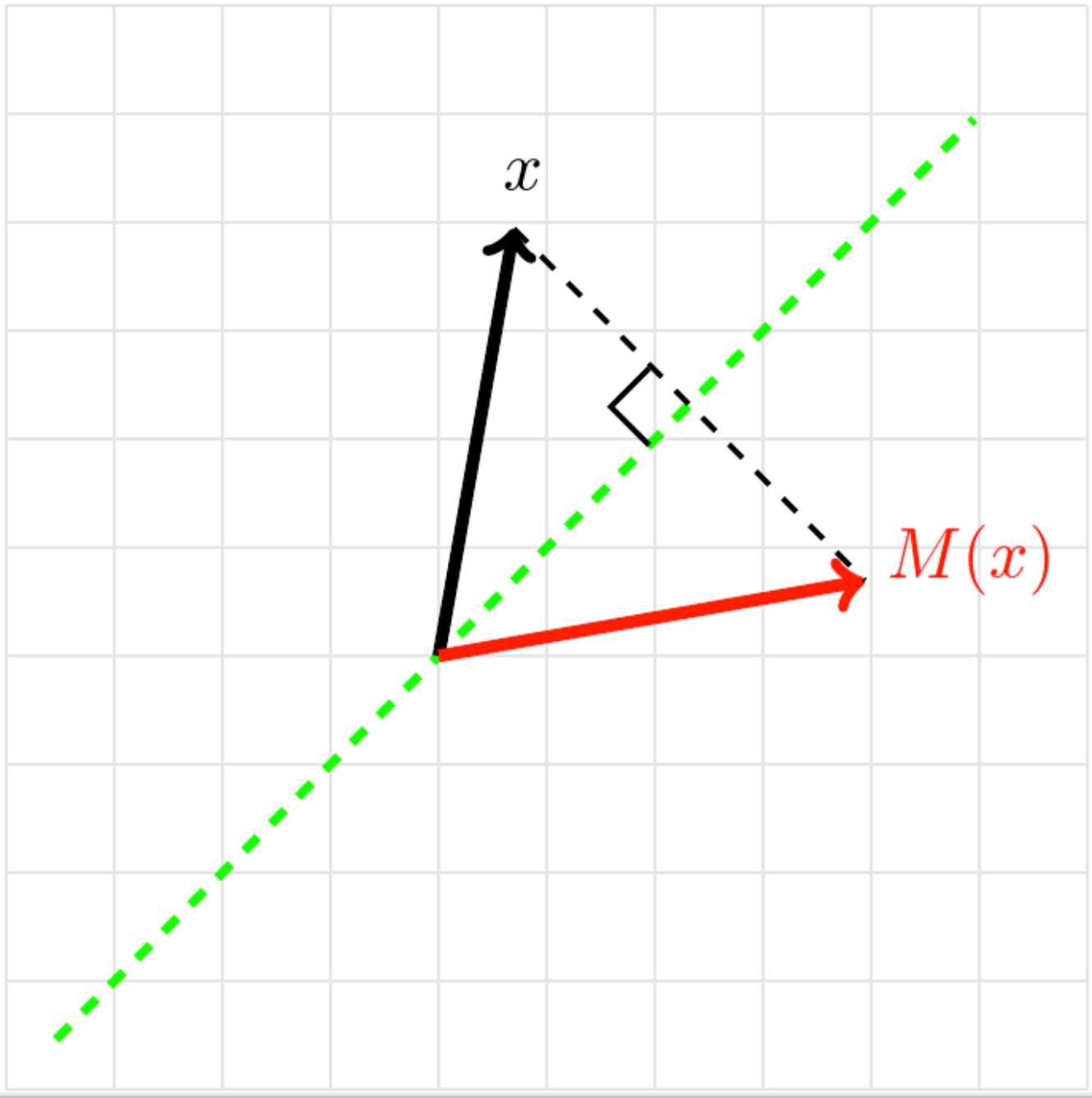
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Homework 2.4.4.1

6/6 points (graded)

A reflection with respect to a 45 degree line is illustrated by



Think of the dashed green line as a mirror. Let $M : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the vector function that maps a vector to its mirror image. Evaluate (by examining the picture)

$$\begin{pmatrix} \chi_0 \\ \chi_1 \end{pmatrix} = M\left(\begin{pmatrix} 1 \\ 0 \end{pmatrix}\right)$$

χ_0

0

✓ Answer: 0 χ_1

1

✓ Answer: 1

$$\begin{pmatrix} \chi_0 \\ \chi_1 \end{pmatrix} = M \left(\begin{pmatrix} 0 \\ 3 \end{pmatrix} \right)$$

 χ_0

3

✓ Answer: 3 χ_1

0

✓ Answer: 0

$$\begin{pmatrix} \chi_0 \\ \chi_1 \end{pmatrix} = M \left(\begin{pmatrix} 1 \\ 2 \end{pmatrix} \right)$$

 χ_0

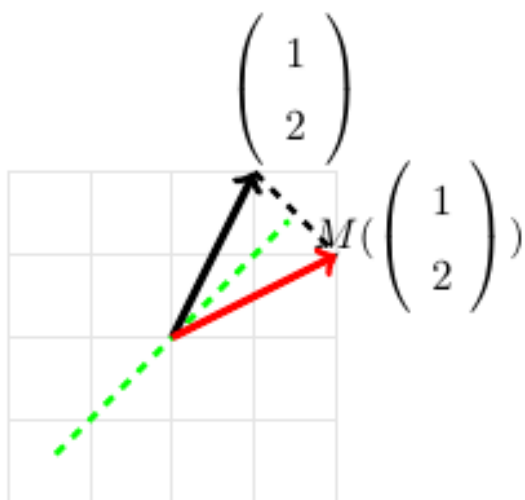
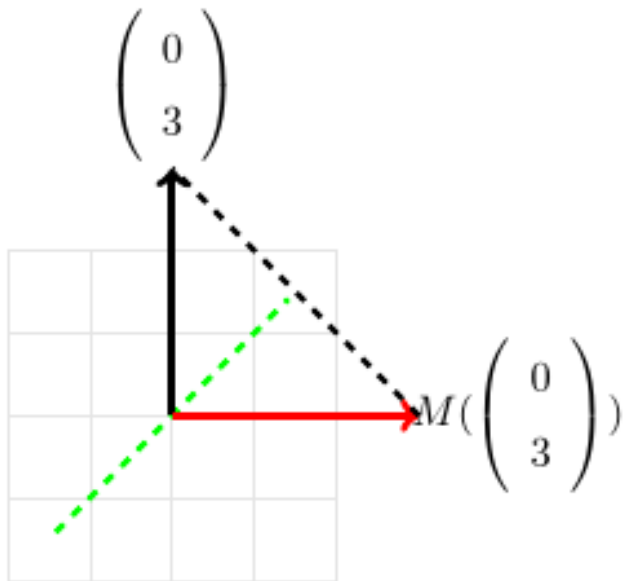
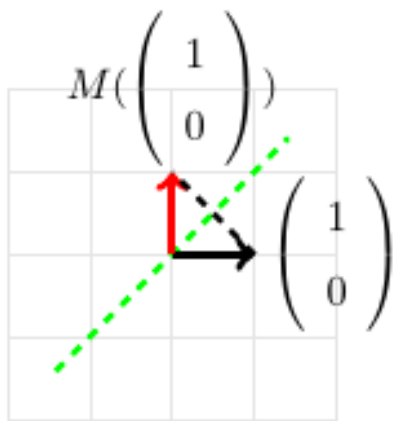
2

✓ Answer: 2 χ_1

1

✓ Answer: 1

Explanation

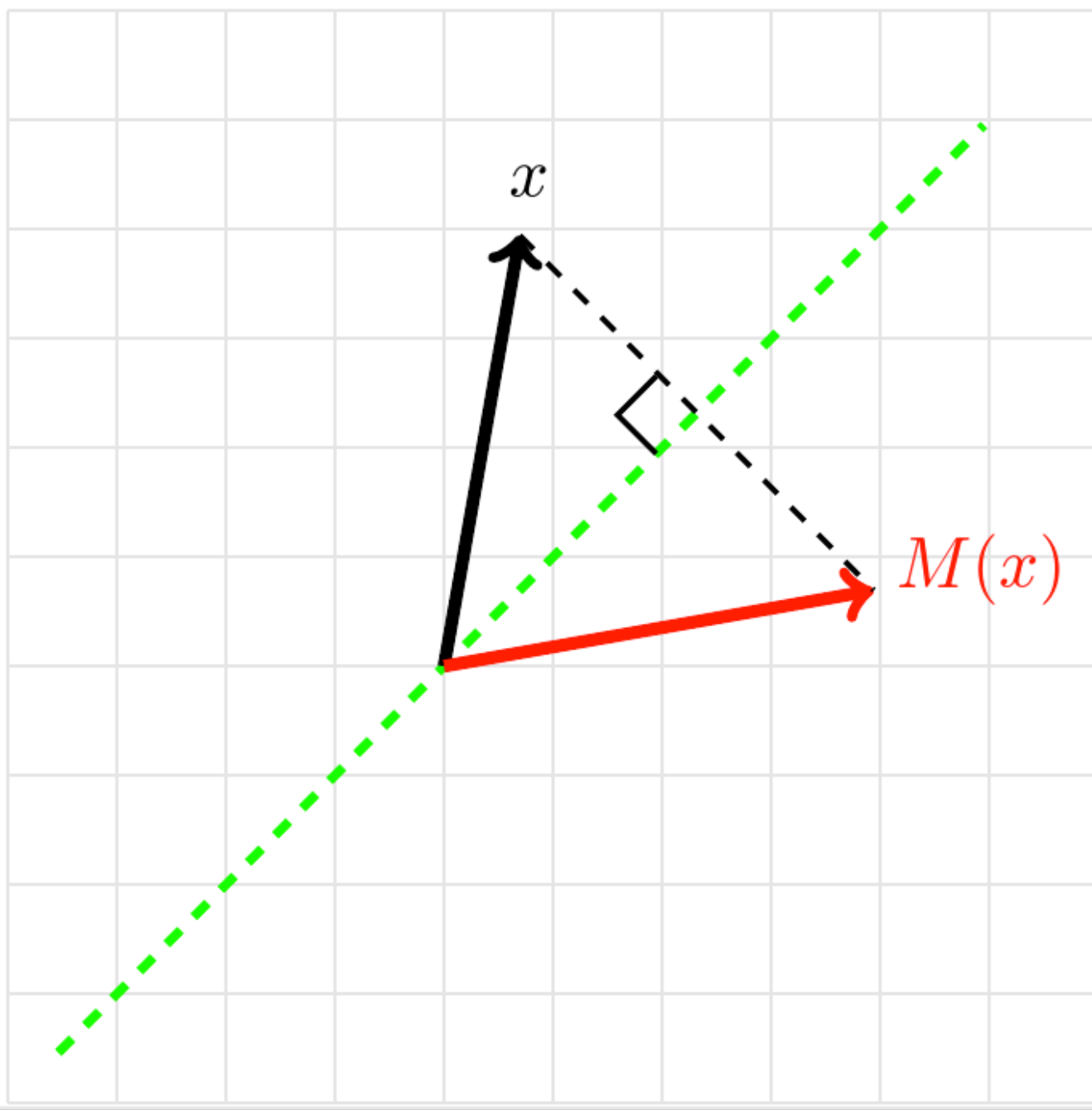


i Answers are displayed within the problem

Homework 2.4.4.2

4/4 points (graded)

A reflection with respect to a 45 degree line is illustrated by



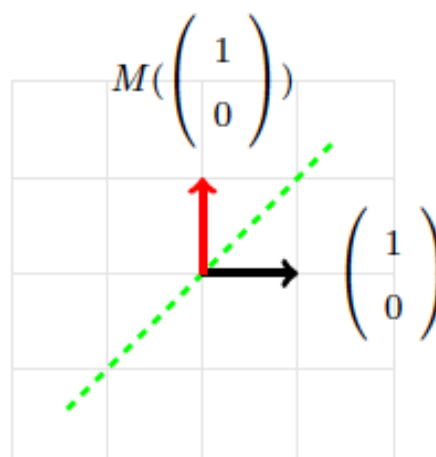
Again, think of the dashed green line as a mirror and let $M : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the vector function that maps a vector to its mirror image. Compute the matrix that represents M (by examining the picture)

$M =$	<input type="text" value="0"/>	<input type="text" value="1"/>
	✓ Answer: 0	✓ Answer: 1
	<input type="text" value="1"/>	<input type="text" value="0"/>
	✓ Answer: 1	✓ Answer: 0

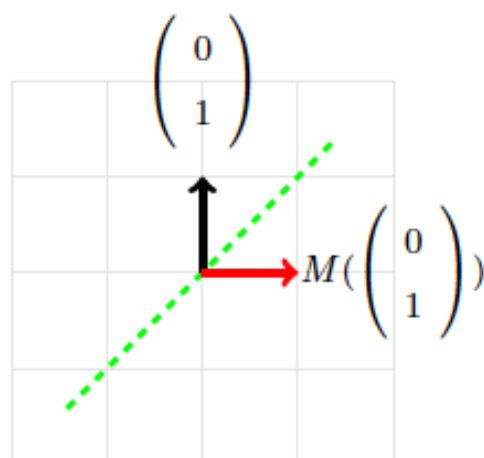
Explanation

Answer:

$$\bullet M\left(\begin{pmatrix} 1 \\ 0 \end{pmatrix}\right) = \begin{pmatrix} 0 \\ 1 \end{pmatrix}:$$



$$\bullet M\left(\begin{pmatrix} 0 \\ 1 \end{pmatrix}\right) = \begin{pmatrix} 1 \\ 0 \end{pmatrix}:$$



Hence the matrix is $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

i Answers are displayed within the problem

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