Angles between vectors using a non-standard inner product

Quiz, 5 questions

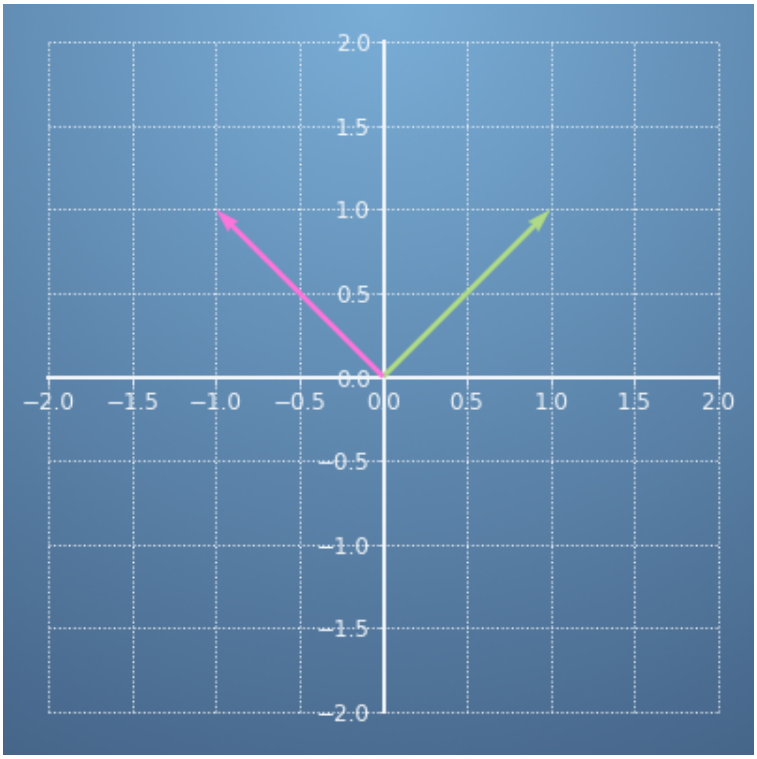
4/5 points (80%)

Congratulations! You passed!

Next Item

1 / 1 point

1.



Compute the angle between $\mathbf{x} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ using the inner product defined by

$$\langle \mathbf{x}, \mathbf{y} \rangle = \mathbf{x}^T \begin{bmatrix} 2 & -1 \\ -1 & 4 \end{bmatrix} \mathbf{y}$$

1.2 rad (69°)

Correct

Absolutely right!

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0.35 rad ($20°$)

1.57 rad ($90°$)

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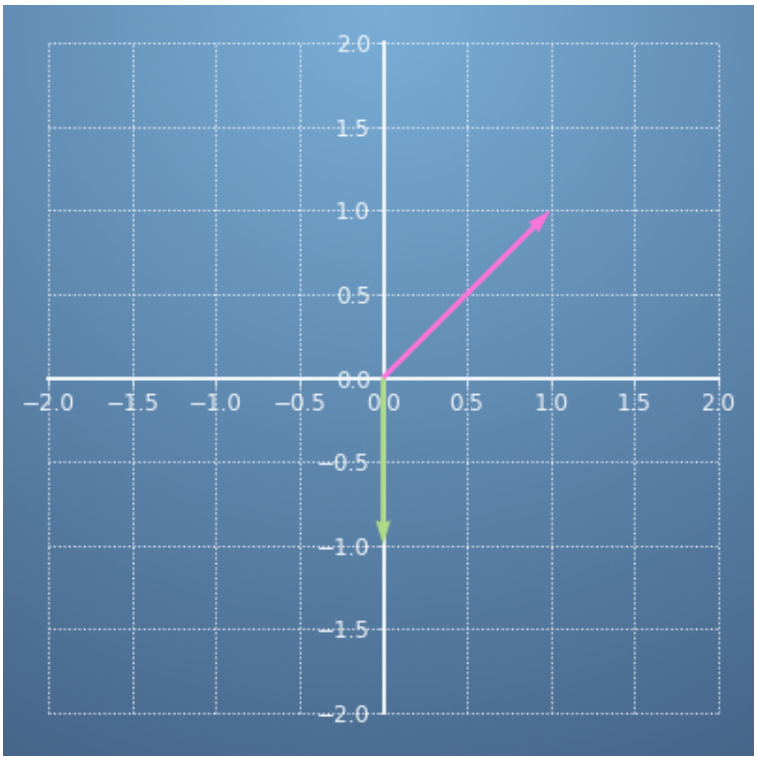
1 / 1 point

2.



Compute the angle between $\mathbf{x} = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ using the inner product defined by

$$\langle \mathbf{x}, \mathbf{y} \rangle = \mathbf{x}^T \begin{bmatrix} 1 & -\frac{1}{2} \\ -\frac{1}{2} & 5 \end{bmatrix} \mathbf{y}$$

2.69 rad ($154°$)

Correct
Well done!

2.35 rad ($135°$)

-0.9 rad ($-52°$)

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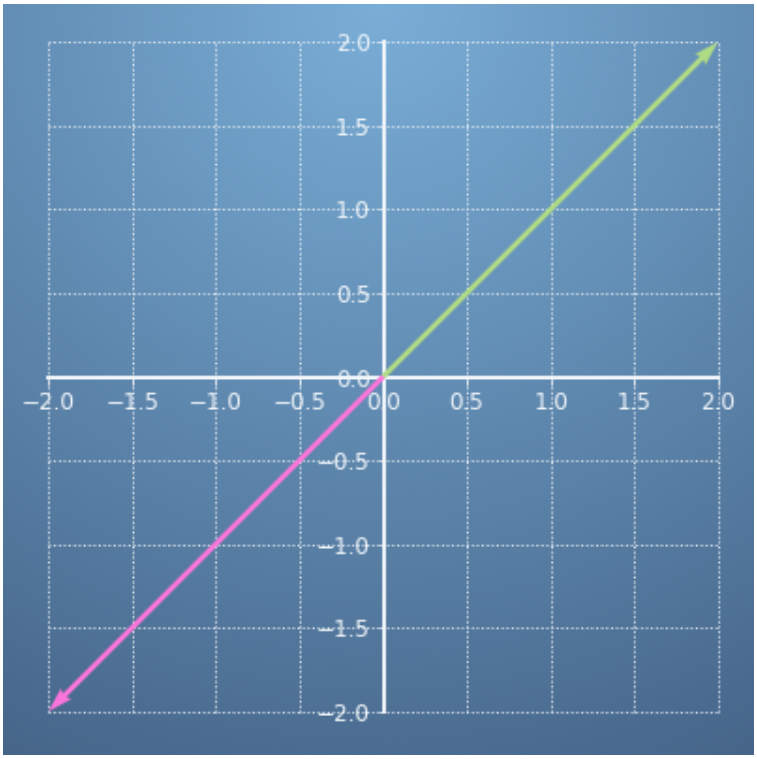
Quiz, 5 questions

4/5 points (80%)

1 / 1 point

3.



Compute the angle between $\mathbf{x} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} -2 \\ -2 \end{bmatrix}$ using the inner product defined by

$$\langle \mathbf{x}, \mathbf{y} \rangle = \mathbf{x}^T \begin{bmatrix} 2 & 1 \\ 1 & 4 \end{bmatrix} \mathbf{y}$$

- 0 rad (0°)
- 3.14 rad (180°)

Correct

Well done: $\pi \approx 3.14$ is the right answer.

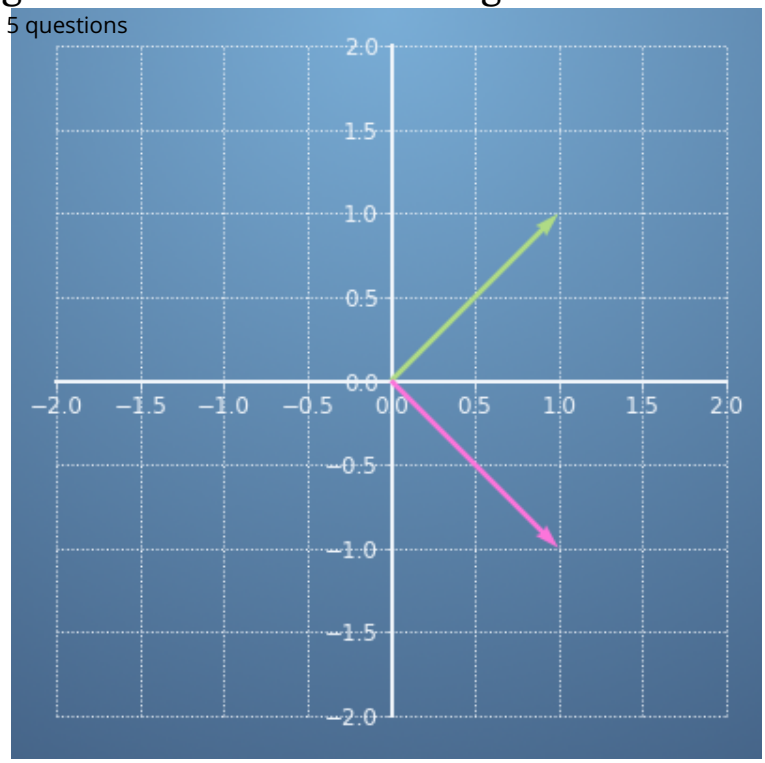
0 / 1 point

4.

Angles between vectors using a non-standard inner product

Quiz, 5 questions

4/5 points (80%)



Compute the angle between $\mathbf{x} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$ using the inner product defined by

$$\langle \mathbf{x}, \mathbf{y} \rangle = \mathbf{x}^T \begin{bmatrix} 1 & 0 \\ 0 & 5 \end{bmatrix} \mathbf{y}$$

- -2.3 rad ($-131°$)

This should not be selected

Did you compute the angle between $\mathbf{y}$ and $\mathbf{x}$ instead of the angle between $\mathbf{x}$ and $\mathbf{y}$? This causes a sign-flip.

- 2.3 rad ($131°$)
- -1.57 rad ($-90°$)
- 1.57 rad ($90°$)

1 / 1 point

5.

Angles between vectors using a non-standard inner product

Quiz, 5 questions

4/5 points (80%)

Compute the angle between $\mathbf{x} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$ using the inner product defined by

$$\langle \mathbf{x}, \mathbf{y} \rangle = \mathbf{x}^T \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & -1 \\ 0 & -1 & 3 \end{bmatrix} \mathbf{y}$$

- [x] 1.37 rad (78°)

Correct
Well done!

- [ ] 0.2 rad (11°)
- [ ] 1.31 rad (75°)