Diagnostic Quiz

Total points 0/0

The equivalent diagnostic quiz, meant for auditors.

✓ Question 1:

What is the magnitude of $2 - \sqrt{2}i$?

- ○ 0
- ○ 2*sqrt(2)
- ○ 2+sqrt(2)
- ◉ sqrt(6) ✓
- ○ 1

Feedback

Correct!

✓ Question 2:

What is the complex conjugate of $e^{\pi i/3}$?

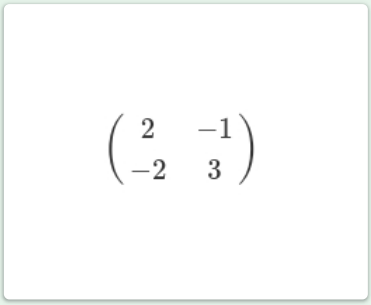
- ○ -(pi/3)*i
- ○ (pi/3)*i
- ○ 1/2 + (sqrt(3)/2) * i
- ◉ 1/2 - (sqrt(3)/2) * i ✓
- ○ e^(2*pi*i/3)
- ○ Option 6

Feedback

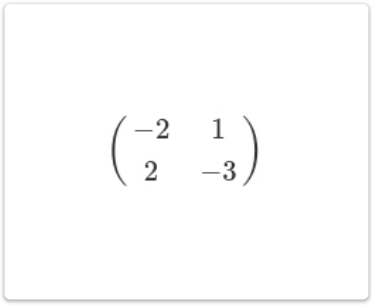
Correct!

✓ Question 3:

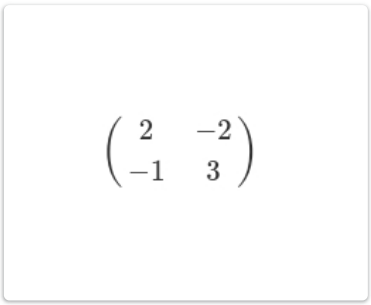
Compute $\begin{pmatrix} -1 & 1 \\ 3 & -1 \end{pmatrix} \cdot \begin{pmatrix} 0 & 1 \\ 2 & 0 \end{pmatrix}$.



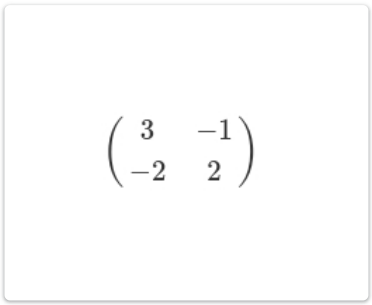
A: ✓



B:



C:



D:

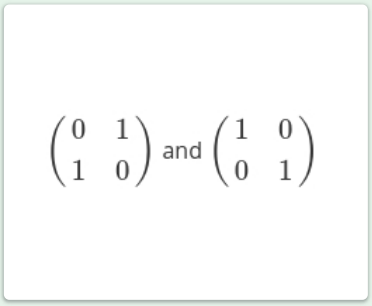
E:

Feedback

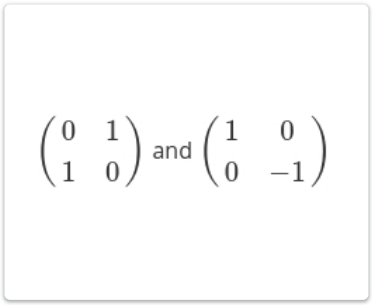
Correct!

✓ Question 4:

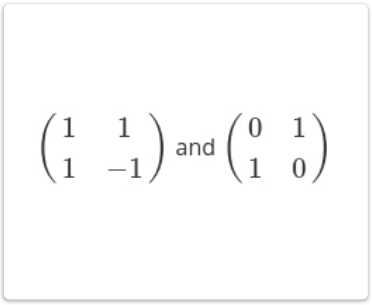
Select all pairs of matrices that commute. (Matrices A and B are said to commute if $AB = BA$)



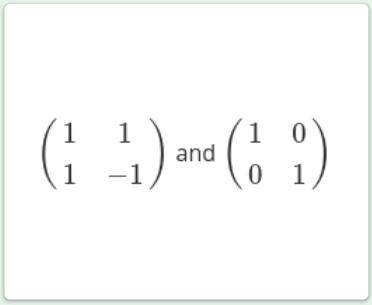
☑ A: ✓



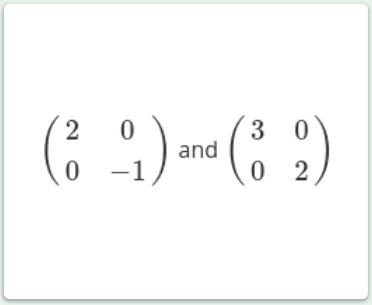
☐ B:



☐ C:



☑ D: ✓



☑ E: ✓

Feedback

Correct!

✓ Question 5:

What is the unit vector in $\mathbb{R}^2$ which makes an angle of $\frac{\pi}{4}$ with both the x- and y-axes?

$\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

A:

$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$

B:

$\begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \end{pmatrix}$

C: ✓

$\begin{pmatrix} \frac{1}{2} \\ \frac{\sqrt{3}}{2} \end{pmatrix}$

D:

$\begin{pmatrix} -\frac{1}{2} \\ \frac{\sqrt{3}}{2} \end{pmatrix}$

E:

Feedback

Correct!

✓ Question 6

What is a real unit vector in $\mathbb{R}^2$ that is orthogonal to $\begin{pmatrix} \frac{1}{\sqrt{3}} \\ \frac{\sqrt{2}}{\sqrt{3}} \end{pmatrix}$?

$\begin{pmatrix} -1 \\ 0 \end{pmatrix}$

A:

$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$

B:

$\begin{pmatrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{pmatrix}$

C:

$\begin{pmatrix} \frac{1}{2} \\ -\frac{\sqrt{3}}{2} \end{pmatrix}$

D:

$\begin{pmatrix} \frac{\sqrt{2}}{\sqrt{3}} \\ -\frac{1}{\sqrt{3}} \end{pmatrix}$

E: ✓

Feedback

Correct!

✓ Question 7:

What is the inner product between the vectors $\begin{pmatrix} \frac{\sqrt{3}}{2} \\ \frac{1}{2} \end{pmatrix}$ and $\begin{pmatrix} \frac{1}{2} \\ \frac{\sqrt{3}}{2} \end{pmatrix}$?

- 0
- 1/2
- sqrt(3)/2 ✓
- 1/sqrt(2)
- 1

Feedback

Correct!

✓ Question 7, continued:

And what is the angle between the two vectors, in degrees?

- 0
- 30 ✓
- 45
- 60
- 90

Feedback

Correct!

✓ Question 8:

Which of the following are eigenvalues of the matrix $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$?

- [x] -1 ✓
- [ ] -1/2
- [ ] 0
- [ ] 1/2
- [x] 1 ✓

✓ Question 9:

Which of the following is the eigenvector corresponding to the largest eigenvalue of the above matrix?

$\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

A:

$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$

B:

$\begin{pmatrix} \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \end{pmatrix}$

C: ✓

$\begin{pmatrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{pmatrix}$

D:

$\begin{pmatrix} \frac{\sqrt{2}}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \end{pmatrix}$

E:

Feedback

Correct!