Announcements

- Everything up to section 6.5 (Wed lecture) is fair game for the final

- You can still bring a single sheet of paper with notes on it to the final
iClicker question #1

Which of the following sets of vectors forms an orthonormal basis for $\mathbb{R}^3$?

A: 
\[
\begin{bmatrix}
1 \\
-1 \\
0
\end{bmatrix},
\begin{bmatrix}
1 \\
1 \\
0
\end{bmatrix},
\begin{bmatrix}
0 \\
0 \\
1
\end{bmatrix}
\]

B: 
\[
\begin{bmatrix}
\frac{1}{\sqrt{2}} \\
\frac{1}{\sqrt{2}} \\
0
\end{bmatrix},
\begin{bmatrix}
0 \\
1 \\
0
\end{bmatrix},
\begin{bmatrix}
0 \\
0 \\
1
\end{bmatrix}
\]

C: 
\[
\begin{bmatrix}
\frac{1}{\sqrt{2}} \\
\frac{1}{\sqrt{2}} \\
0
\end{bmatrix},
\begin{bmatrix}
\frac{1}{\sqrt{2}} \\
-\frac{1}{\sqrt{2}} \\
0
\end{bmatrix}
\]

D: All of them

E: None of them

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Answer: E - Choice A is an orthogonal basis of $\mathbb{R}^3$, but the vectors are not normalized so it is not an orthonormal basis. Choice B is a set of normalized vectors but they are not all orthogonal to each other (e.g., the first two). Choice C is an orthonormal basis, but only for a 2D subspace of $\mathbb{R}^3$ (not $\mathbb{R}^2$!). You need 3 linearly independent vectors to form a basis for $\mathbb{R}^3$ (notice that there's no way to get nonzero $x_3$ components from these two vectors).