Multiple choice questions - Vectors and systems of linear equations

Year: University Year 1 · 10

Question 1 $(1,2,2)\cdot(2,0,-1)=$

- ◯ **A.** 0
- ◯ **B.** 2
- ◯ **C.** -2
- ◯ **D.** 4

Question 2 $(1,0,0)\times(0,1,0)=$

- ◯ **A.** $(0,0,1)$
- ◯ **B.** $(0,0,-1)$
- ◯ **C.** $(1,1,0)$
- ◯ **D.** 0

Question 3 The cross product $\mathbf{a}\times\mathbf{b}$ is

- ◯ **A.** a scalar
- ◯ **B.** perpendicular to a and b
- ◯ **C.** parallel to a
- ◯ **D.** equal to b times a

Question 4 A system is inconsistent if its echelon form has a row

- ◯ **A.** $[0\ 0\ 0 \mid 0]$
- ◯ **B.** $[0\ 0\ 0 \mid c]$, $c\neq 0$
- ◯ **C.** $[1\ 0\ 0 \mid c]$
- ◯ **D.** $[1\ 1\ 1 \mid 1]$

Question 5 A homogeneous system with more unknowns than equations has

- ◯ **A.** only the trivial solution
- ◯ **B.** non-trivial solutions
- ◯ **C.** no solution
- ◯ **D.** exactly one solution

Question 6 A plane with normal $(1,2,3)$ through the origin is

- ◯ **A.** $x+2y+3z=0$
- ◯ **B.** $x+2y+3z=1$
- ◯ **C.** $x=2y=3z$

- ◯ **D.** $3x + 2y + z = 0$

Question 7 Which is not an elementary row operation?

- ◯ **A.** swap rows
- ◯ **B.** multiply a row by 0
- ◯ **C.** add a multiple of a row to another
- ◯ **D.** multiply a row by 3

Question 8 If rank $= n$ (unknowns) and the system is consistent, the solution is

- ◯ **A.** unique
- ◯ **B.** non-existent
- ◯ **C.** a line
- ◯ **D.** a plane

Question 9 $|(3, 4, 12)| =$

- ◯ **A.** 13
- ◯ **B.** 19
- ◯ **C.** 7
- ◯ **D.** 5

Question 10 If $\mathbf{a} \cdot \mathbf{b} = 0$ the vectors are

- ◯ **A.** parallel
- ◯ **B.** perpendicular
- ◯ **C.** equal
- ◯ **D.** unit vectors

Answer grid - Vectors and systems of linear equations

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Question	Answer	Explanation
1	**A**	$2 + 0 - 2 = 0$; the vectors are perpendicular.
2	**A**	$\mathbf{i} \times \mathbf{j} = \mathbf{k}$.
3	**B**	By definition.
4	**B**	It says $0 = c$.
5	**B**	Rank .
6	**A**	$\mathbf{n} \cdot \mathbf{r} = 0$.
7	**B**	Multiplying by 0 destroys information.
8	**A**	No free parameters.
9	**A**	$\sqrt{9 + 16 + 144} = 13$.
10	**B**	$\cos\theta = 0$ (for non-zero vectors).