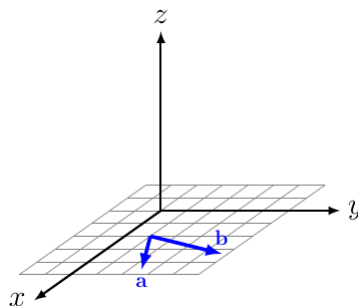


Please show **all** your work and write your answer on the answer line unless otherwise indicated by the problem. Please read the questions carefully. You have 20 minutes for the quiz.

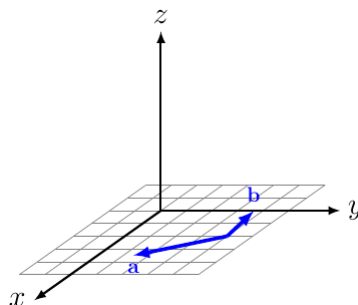
Name: _____ ID number _____

1. (8pts) The figure below shows two vectors \mathbf{a} and \mathbf{b} in \mathbb{R}^3 that are in the xy -plane. Suppose $\|\mathbf{a}\| = 3$ and $\|\mathbf{b}\| = 4$, and the angle between the two vectors is 30 degrees.



- (a) $a \cdot b = \frac{\sqrt{3}}{2}12$
 (b) The cross product $a \times b$ is in the direction of k
 (c) $\|a \times b\| = 6$
 (d) The area of the triangle formed by a and b is 3

The figure below shows two vectors a and b in \mathbb{R}^3 that are in the xy -plane. Suppose that $\|a\| = 3$ and $\|b\| = 2$, and the angle between the two vectors is 120 degrees.



- (a) The area of the parallelogram formed by a and b is $\frac{\sqrt{3}}{2}6$
 (b) $a \times b$ is the same direction as $-k$
 (c) $k \cdot (a \times b) = -\frac{\sqrt{3}}{2}6$
 (d) $(4i + 2j) \cdot (a \times b) = 0$

2. (12pts) Mark the following statements true or false by writing true or false next to each statement. v and w are vectors, c is a scalar, and i, j, k are the standard unit vectors.
- (a) $v \cdot (v \times w)$ is always zero *true*
 - (b) $(i \times j) \cdot k = i \cdot (j \times k)$ *true*
 - (c) $\|cv\| = c\|v\|$ *false*
 - (d) $\|v + w\| = \|v\| + \|w\|$ *false*
 - (e) If $\|v - w\| = 0$ then $v = w$ *true*
 - (f) If $\|v \cdot w\| = 1$ then v and w are unit vectors *false*