

Calc 251 Attendance Quiz

1. a) $\langle 1, 1, 1 \rangle$, $\langle 3, -2, -1 \rangle$
 u v

$$\cos \theta = \frac{u \cdot v}{|u| \cdot |v|}$$

$$u \cdot v = 1(3) + 1(-2) + 1(-1) = 3 - 2 - 1 = 0$$

$$\cos \theta = 0$$

$$\theta = \arccos(0)$$

$$\theta = \frac{\pi}{2}, \text{ Vectors are orthogonal}$$

b) $\langle 4, 3 \rangle$, $\langle 2, -4 \rangle$
 u v

$$\cos \theta = \frac{u \cdot v}{|u| \cdot |v|}$$

$$u \cdot v = 4(2) + 3(-4) = 8 - 12 = -4$$

$$|u| = \sqrt{4^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25} = 5$$

$$|v| = \sqrt{2^2 + (-4)^2} = \sqrt{20}$$

$$\cos \theta = \frac{-4}{5\sqrt{20}}$$

$$\theta = 100.3, \text{ angle is obtuse}$$

2. $v = \langle 0, 1, -1 \rangle$, $w = \langle 1, -1, 0 \rangle$. Find $v \times w$

$$\begin{array}{ccc|ccc|ccc|ccc} i & j & k & & & & & & & & & \\ 0 & 1 & -1 & \rightarrow & 1 & -1 & i & - & 0 & -1 & j & + & 0 & 1 & k \\ 1 & -1 & 0 & & -1 & 0 & & & 1 & 0 & & & 1 & -1 & \end{array}$$
$$(0-1)i - (0-(-1))j + (0-1)k$$
$$-1i - 1j - 1k$$

$v \times w = \langle -1, -1, -1 \rangle$