

Quiz 5.5

$$1) A = (3, -3, 1) \quad B = (4, 9, 2)$$

$$A \times B =$$

$$= ((-3 \cdot 2) - (9 \cdot 1)) + ((1 \cdot 4) - (2 \cdot 3)) + ((3 \cdot 9) - (4 \cdot -3))$$

$$= ((-6 - 9) + (4 - 6) + (27 - -12))$$

$$= (-15, -2, 39)$$

$$2) |A \times B| = |(-15, -2, 39)|$$

$$= \sqrt{(-15)^2 + (-2)^2 + (39)^2} = \sqrt{1750} \approx 41.83$$

$$3) A = (1, 4, 0) \quad B = (4, 2, 4)$$

$$\vec{A}_{\parallel \vec{B}} = \frac{(\vec{A} \cdot \vec{B})}{\|\vec{B}\|^2} \vec{B}$$

$$= \frac{12}{36} (4, 2, 4)$$

$$= \left(\frac{4}{3}, \frac{2}{3}, \frac{4}{3} \right)$$

$$\vec{A} \cdot \vec{B} = (4 + 8 + 0) = 12$$

$$\|\vec{B}\|^2 = 4^2 + 2^2 + 4^2$$

$$= 16 + 4 + 16 = 36$$

$$4) A = (1, 4, 0) \quad B = (4, 2, 4)$$

$$A \perp B = \vec{A} - \left(\frac{4}{3}, \frac{2}{3}, \frac{4}{3} \right) = \left(-\frac{1}{3}, \frac{10}{3}, -\frac{4}{3} \right)$$

$$5) i \cdot j = (1, 0, 0) \cdot (0, 1, 0) = (0 + 0 + 0) = 0$$

$$j \cdot k = (0, 1, 0) \cdot (0, 0, 1) = (0 + 0 + 0) = 0$$

$$k \cdot i = (0, 0, 1) \cdot (1, 0, 0) = (0 + 0 + 0) = 0$$