13.3 The Dot Product

Name: Date:

P 5. Perform the following operation

$$\vec{c} \cdot \vec{a} + \vec{a} \cdot \vec{y}$$

on the following 3-dimensional vectors

$$\vec{a} = 2\vec{j} + \vec{k} \quad \vec{b} = -3\vec{i} + 5\vec{j} + 4\vec{k} \quad \vec{c} = \vec{i} + 6\vec{j}$$

P 7. Perform the following operation

$$\left(\vec{a} \cdot \vec{b}\right) \vec{a}$$

on the following 3-dimensional vectors

$$\vec{a} = 2\vec{j} + \vec{k} \quad \vec{b} = -3\vec{i} + 5\vec{j} + 4\vec{k} \quad \vec{c} = \vec{i} + 6\vec{j}$$

P 13. Find a normal vector to the plane

$$z = 3x + 4y - 7$$

P 18. Find an equation of the plane perpendicular to $5\vec{i} + \vec{j} - 2\vec{k}$ and passing through $(0, 1, -1)$.

P 25. Compute the angle between

$$\vec{i} + \vec{j} \text{ and } \vec{i} + 2\vec{j} - \vec{k}$$

P 32. Match the plane in (a)-(d) with one or more of the descriptions in (I)-(IV).

(a) $3x - y + z = 0$

(b) $4x + y + 2z - 5 = 0$

(c) $x + y = 5$

(d) $x = 5$

(I) Goes through the origin.

(II) Has a normal vector parallel to the xy-plane.

(III) Goes through the point $(0, 5, 0)$.

(IV) Has a normal vector whose dot products with $\vec{i}, \vec{j}, \vec{k}$ are all positive.