

## Calculus III - Worksheet #2

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- Find the vector using the properties of cross product
  - $(\mathbf{i} \times \mathbf{j}) \times \mathbf{k}$
  - $(\mathbf{i} + \mathbf{j}) \times (\mathbf{i} - \mathbf{j})$
- If  $\mathbf{a} = \langle 1, 0, 1 \rangle$ ,  $\mathbf{b} = \langle 2, 1, -1 \rangle$ , and  $\mathbf{c} = \langle 0, 1, 3 \rangle$ ,
  - Find  $\mathbf{a} \times (\mathbf{b} \times \mathbf{c})$
  - Find  $(\mathbf{a} \times \mathbf{b}) \times \mathbf{c}$
  - Compare  $\mathbf{a} \times (\mathbf{b} \times \mathbf{c})$  and  $(\mathbf{a} \times \mathbf{b}) \times \mathbf{c}$ , are they equal?
- Find the area of the triangle  $P(0, -2, 0)$ ,  $Q(4, 1, -2)$  and  $R(5, 3, 1)$
- Problem 39 from Section 12.4 on page 815
- Show that  $|\mathbf{a} \times \mathbf{b}|^2 = |\mathbf{a}|^2|\mathbf{b}|^2 - (\mathbf{a} \cdot \mathbf{b})^2$
- Problem 1 from Section 12.5 on page 824
- Find the parametric and symmetric equations for the line passing through  $(2, 1, 0)$  and perpendicular to both  $\mathbf{i} + \mathbf{j}$  and  $\mathbf{j} + \mathbf{k}$ .
- Problem 21, 22.
- Find the equation of the plane passing through  $(1, -1, 1)$  and contains the line of intersection of the planes  $x + y - z = 2$  and  $2x - y + 3z = 1$ .
- Problem 60 on page 825.