MATH 1920, Fall 2017
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Sections: 201, 202

Name:____________________________

Section 13.3-Section 13.5 Review

Brief Summary of 13.3-13.5 (see full summaries at the end of each section in the course textbook.)

- The *dot product* of $\boldsymbol{v} = \langle a_1, b_1, c_1 \rangle$ and $\boldsymbol{w} = \langle a_2, b_2, c_2 \rangle$ is: ____________________________________.
- Let **v** and **w** be two vectors, and θ the angle between them. State the relation that relates $\mathbf{v}\cdot\mathbf{w}$ to θ.
- The *cross product* of vectors $\boldsymbol{v} = \langle a_1, b_1, c_1 \rangle$ and $\boldsymbol{w} = \langle a_2, b_2, c_2 \rangle$ is the vector: $\boldsymbol{v} \times \boldsymbol{w}$ given by:
- The equation of the plane passing through $P_0 = (x_0, y_0, z_0)$ with normal vector $\mathbf{n}= \langle a, b, c \rangle$ is:

  vector form: $\mathbf{n}\cdot\langle x, y, z \rangle = d$

  scalar form: $ax + by + cz = d$ where $d =$______________________________.

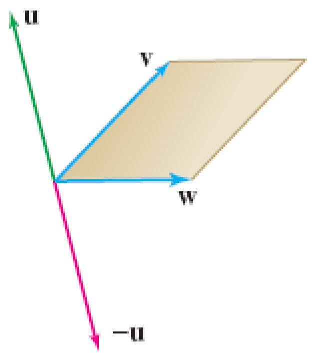
Section 13.3 Additional Exercises

1. Find $\mathbf{v}\cdot\mathbf{e}$ where $||\mathbf{v}|| = 3$, **e** is a unit vector, and the angle between **e** and **v** is $\frac{2\pi}{3}$.

2. Show that if **e** and **f** are unit vectors such that $||\mathbf{e} + \mathbf{f}|| = \frac{3}{2}$, then $||\ \mathbf{e} - \mathbf{f}|| = \frac{\sqrt{7}}{2}$.

Section 13.4 Additional Exercises

1. Which of the following form a right-handed system in the figure below?
   (a) {**v**, **w**, **u**} (b) {**w**, **v**, **u**} (c) {**v**, **u**, **w**}
   (d) {**u**, **v**, **w**} (e) {**w**, **v**, **-u**} (f) {**v**, **-u**, **w**}



2. Calculate $\boldsymbol{v} \times \boldsymbol{w}$ with $\boldsymbol{v} = \langle 1, 2, 1 \rangle$ and $\boldsymbol{w} = \langle 3, 1, 1 \rangle$.

Section 13.5 Additional Exercises
The figure below might be helpful in completing exercises 3-5

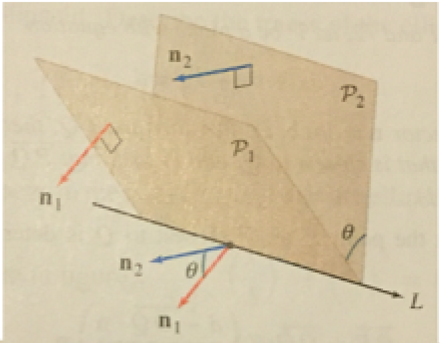


FIGURE 9 By definition, the angle between two planes is the angle between their normal vectors.

1. Find an equation of the plane passing through $P = (2, -1, 4)$, $Q = (1, 1, 1)$, and $R = (3, 1, -2)$.

2. Find an equation of the plane that passes through $P = (4, 1, 9)$ and is parallel to $x + y + z = 3$.

3. Find an equation of a plane making an angle of $\frac{\pi}{2}$ with the plane $3x + y - 4z = 2$.

4. Find a plane that is perpendicular to the two planes $x + y = 3$ and $x + 2y - z = 4$.

5. Let L denote the intersection of the planes $x - y - z = 1$ and $2x + 3y + z = 2$. Find the parametric equations for the line L.