2020년 1학기 수학2 2주차 손과제(공통) 학과: 사이버보안 학번: 20192669 성명: 김우성 (총 2페이지)

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제출 방법: '아주Bb/과제출제/제출'에 upload된 과제를 프린트한 후 풀기 => 풀은 과제를 사진 또는 스캔하여 '아주Bb/과제출제/제출'에 upload => 이것으로 동영상강의학습활동 출결 인정

Let $\vec{u} = \langle -1, 2, 1 \rangle$, $\vec{v} = \langle 3, 1, -1 \rangle$. Then

$$\vec{u} \times \vec{v} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & 2 & 1 \\ 3 & 1 & -1 \end{vmatrix}$$

$= \langle -3, -2, -7 \rangle$

Section 12.5 Equations of Lines and Planes

1. (a) Find an equation of the line through the points $P(1, -2, 3)$ and $Q(4, 5, 6)$.

• **parametric** equations:

$x = 1+3t,\ y = -2+7t,\ z = 3+3t$

• **symmetric** equation:

$$\frac{x-1}{3} = \frac{y+2}{7} = \frac{z-3}{3}$$

(b) Find **vector equation** for the line segment from $P(1, -2, 3)$ to $Q(4, 5, 6)$.

$\vec{r} = \langle 1+3t, -2+7t, 3+3t \rangle$

2. Find the **symmetric** equations of the line through $(2, -4, 5)$ that is perpendicular to the plane $3x + y - 2z = 5$.

$$\frac{x-2}{3} = \frac{y+4}{1} = \frac{z-5}{-2}$$

3. Find the **symmetric** equations of the line through $(2, -4, 5)$ that is parallel to the plane $3x + y - 2z = 5$ and perpendicular the line $\frac{x+8}{2} = \frac{y-5}{3} = \frac{z-1}{-1}$.

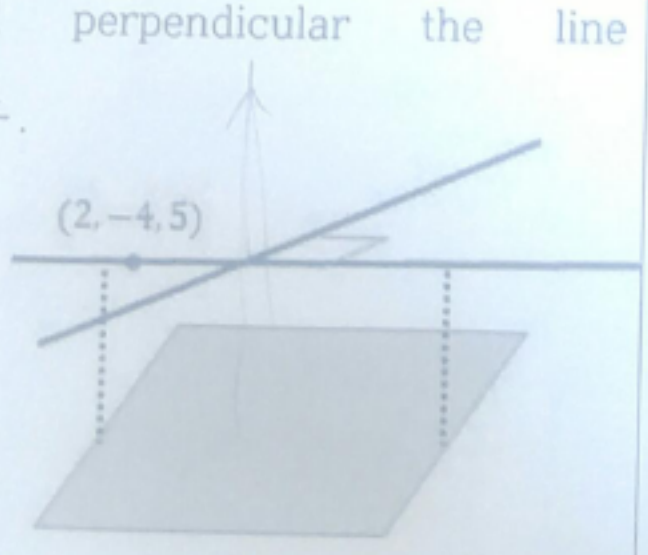
$\vec{v} = \langle a, b, c \rangle$

$\langle 3, 1, -2 \rangle \times \langle 2, 3, -1 \rangle$

$= \langle a, b, c \rangle$

$= \langle 5, -3+4, 9-2 \rangle$

$5, 1, 7$

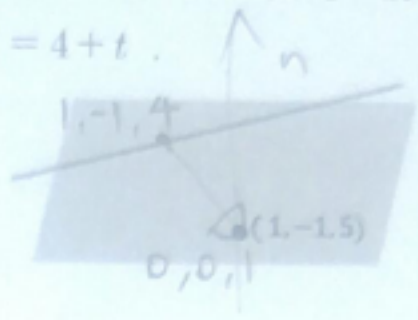


$\frac{x-2}{5} = \frac{y+6}{1} = \frac{z-5}{7}$

4. Find the equation of the **plane** that passes through the point $(1, -1, 5)$ and contains the line $x = 1+2t,\ y = -1+3t,\ z = 4+t$.

$\langle 0,0,1 \rangle \times \langle 2, 3, 1 \rangle$

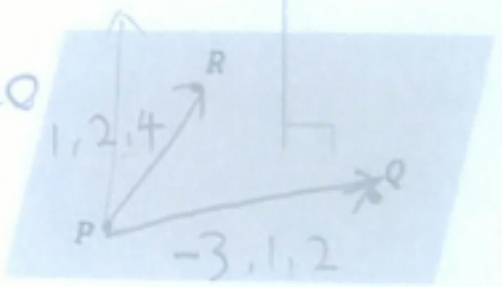
$= \langle -3, -1, 0 \rangle$



$-3(x-1) - (y+1) = 0$

5. (a) Find an equation of the **plane** through the points $P(1, 0, 1)$, $Q(-2, 1, 3)$, $R(4, 2, 5)$.

$14(y-0) + 7(z-1) = 0$



$\vec{n} = \langle 4-4, 2+2, 1+6 \rangle$

$\langle 0, 14, 7 \rangle$

(b) Find the **area** of the triangle with vertices $P(1, 0, 1)$, $Q(-2, 1, 3)$, $R(4, 2, 5)$.

$$\frac{\sqrt{14^2+7^2}}{2} = \frac{\sqrt{245}}{2}$$

$\frac{\sqrt{245}}{2}$

6. Find parametric equations for the **line** of intersection of the planes $3x - 2y + z = 1$ and $2x + y - 3z = 3$.

$z = 0,\ 3x - 2y = 1$

$2x + y = 3$

$+4x + 2y = 6$

$7x = 7$

$x = 1\ \ y = 1\ \ z = 0$

$\langle 3, -2, 1 \rangle \times \langle 2, 1, -3 \rangle$

$= +6-1, -9-2, 3+4$

$\langle 5, -11, 7 \rangle$

$\frac{x-1}{5} = \frac{y-1}{-11} = \frac{z-0}{7}$