Tutorial 8: Lines and Planes in Space
(more examples)

Dr. Mohammad Reza Bahrami

Innopolis University
Course of Essentials of Analytical Geometry and Linear Algebra I

October 23, 2020

Last weeks' topics

- Planes in Space
  - General Equation of a Plane
  - Equation of a Plane Passing through Three Points
  - Other Forms of Equations of a Plane
  - Angle Between Two Planes
  - Distance From a Point to a Plane
  - Relative Position of Planes
  - Relative Position of a Plane and a Line

Content

- More Examples on:
  - Lines in Space
  - Planes in Space

Example 1

- Find the equation of a line passing through the point $(4, -7)$ parallel to the line $4x + 6y = 9$.

Solution:

Example 2

- Find the equation of a line passing through the point $(-3, 8)$ perpendicular to the line $2x - 7y = -11$.

Solution:

Example 3

- Find the distance between parallel lines given by the equations $Ax + By + C1 = 0$ and $Ax + By + C2 = 0$.

Solution:

Example 4

- Find the equations of the lines parallel to $3x - 2y = 8$ and having distance $\sqrt{52}$ from point $F(-2, -4)$.

Solution:

Example 4 (cntd.)

- Find the equations of the lines parallel to $3x - 2y = 8$ and having distance $\sqrt{52}$ from point $F(-2, -4)$.

Solution:

Example 5

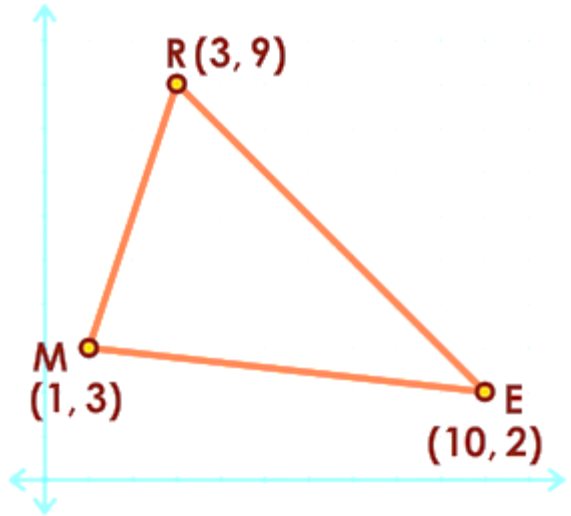
- Find the parametric equation of the plane given by equation $x - 2y + 3z = 1$.

Solution:

Example 6

- Find the orthocenter of a triangle with the vertices $\mathrm{R}(3,9), M(1,3)$, and $E(10,2)$.

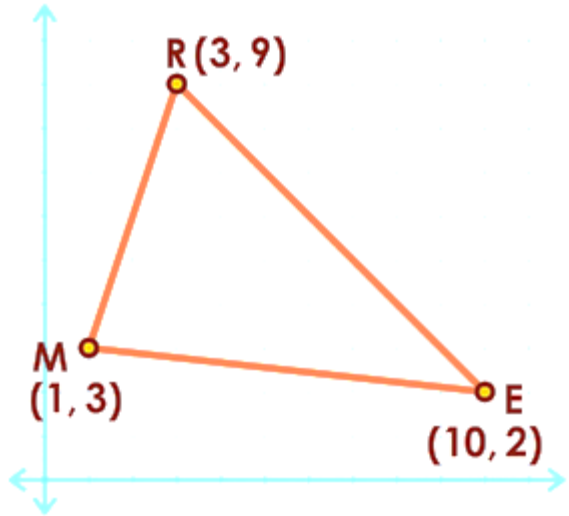
Solution:



Example 6 (cntd.)

- Find the orthocenter of a triangle with the vertices $\mathrm{R}(3,9), M(1,3)$, and $E(10,2)$.

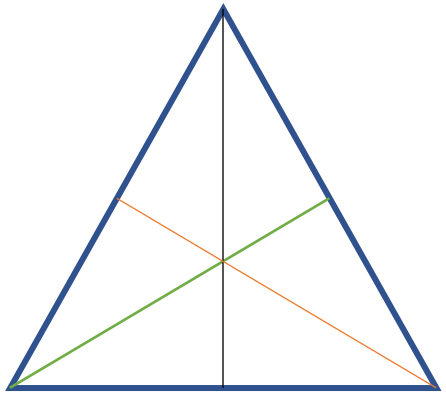
Solution:



Example 7

- Point $H(1, 2)$ is the orthocenter of a triangle, and $(4, -3)$ and $(-2, 5)$ are the coordinates of vertices. Find the coordinates of the third vertices.

Solution:



Example 8

- Compose the equations of lines passing through point $A(3,2)$ and forming angles of $45°$ with the line $x - 2y = 3$.

Solution:

- Mid-Term Exam

Good Luck