



Geometry Journey Video Series

Program #10

**Lines, Planes and Angles
in Space**



**Satellite Broadcasting
VHS
and Internet/Intranet Streaming**

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Geometry Journey Series

Program #10 - Lines, Planes and Angles in Space

Program Description

The ability to view lines, planes and angles in three-dimensional space is the essential skill in studying solid geometry. They are the basic "building blocks" of this subject. This video is designed to help students develop the ability to visualize and understand these critical concepts.

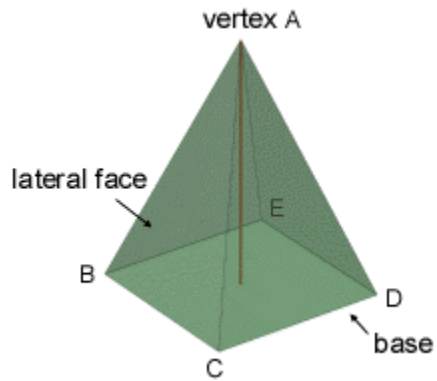
This program is the #10 episode in the fifteen 15-minute Geometry Journey Series.

Synopsis

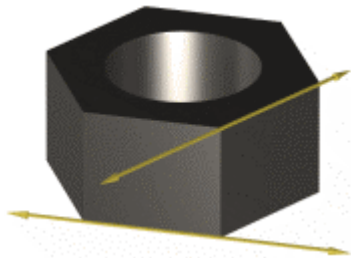
This program will cover the following topics:

1. Introduction to Plane
 - a) Basic Properties of a Plane: Postulate 1
 - b) Basic Properties of a Plane: Postulate 2
 - c) Basic Properties of a Plane: Postulate 3
2. Two Lines in Space
 - a) Angle Formed by Two Non-coplanar Lines
3. A Line and a Plane in Space
4. Two Planes in Space
 - a) Dihedral Angles

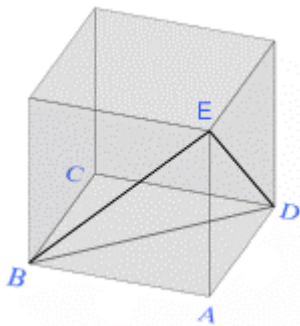
1) A plane can be named by three or more non-collinear points that it contains. Name three planes that intersect at point C.



2) What is the angle formed by two non-coplanar lines shown in the figure?



3) Find the dihedral angle formed by the plane BDE and the plane ABCD.



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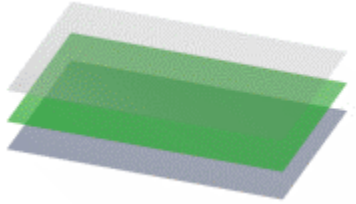
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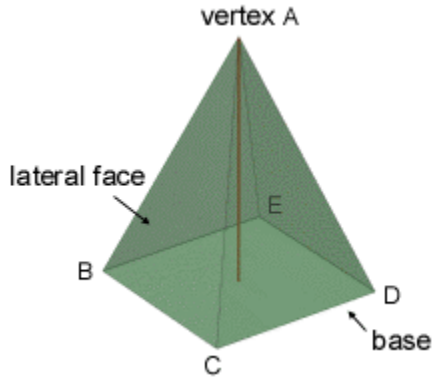
Program #10 - Lines, Planes and Angles in Space

Discussion Questions

Question: Can you list a few ways for three distinct planes to intersect?

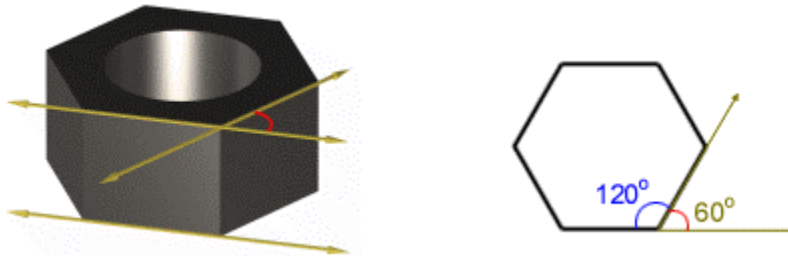


1) A plane can be named by three or more non-collinear points that it contains. Name three planes that intersect at point C.



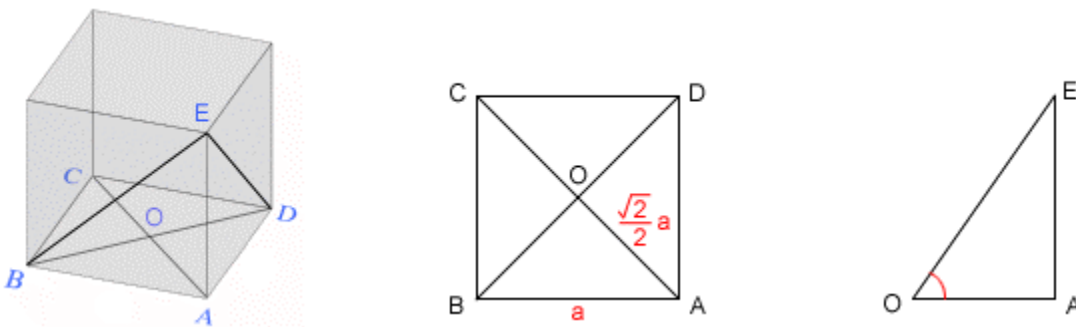
Answer: ABC, ACD, and BCDE.

2) What is the angle formed by two non-coplanar lines shown in the figure?



Answer: The angle is defined as the non-obtuse angle formed by any two coplanar lines that are parallel to the two non-coplanar lines respectively. As shown, it is equal to 60° .

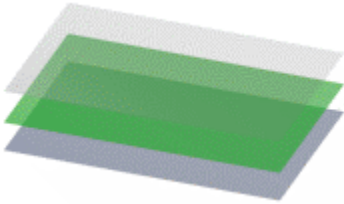
3) Find the dihedral angle formed by the plane BDE and the plane ABCD.



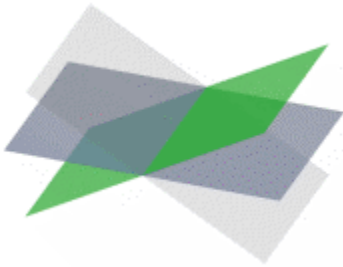
Answer: The dihedral angle = $\angle AOE = \arctan(EA/OA) = \arctan(2^{1/2}) = 54.74^\circ$.

Hints to Discussion Questions

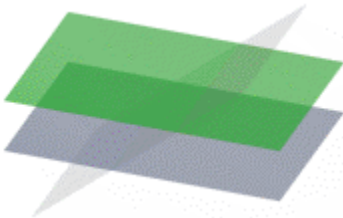
Question: Can you list a few ways for three distinct planes to intersect?



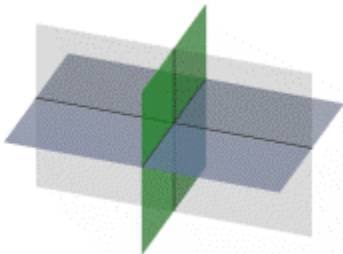
The diagram at the left shows three parallel planes this case, there is no point of intersection.



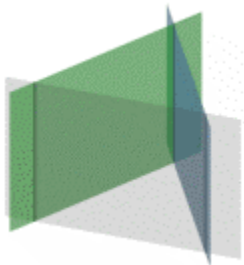
This example shows only one line of intersection formed by three planes.



This figure demonstrates two lines of intersection formed by three planes.



There are three lines of intersection that intersect at only one point.



In this case, three planes intersect to form three lines of intersection that are parallel to each other.

- End -