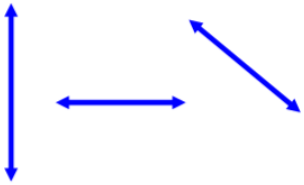
Name:_____ Date:_____ Period:____

Chapter 7: Right Triangles
Topic 1: Plane Geometry

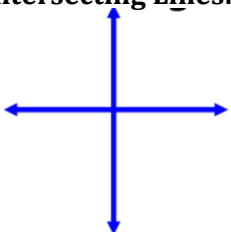
Common "Things" to know for this lesson:

1) Line:

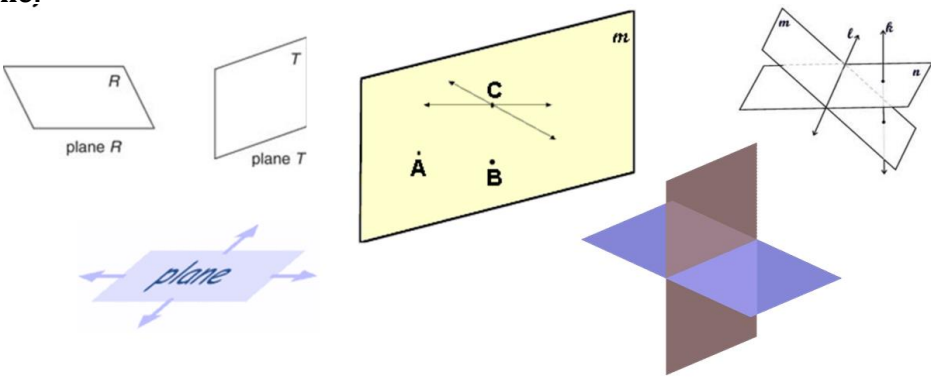


2) Point:

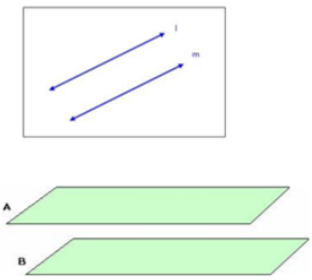
3) Intersecting Lines:



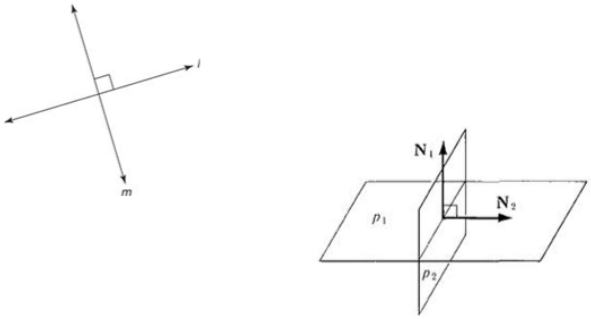
4) Plane:



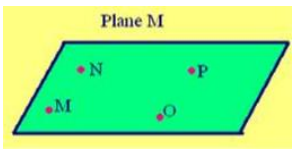
5) Parallel:



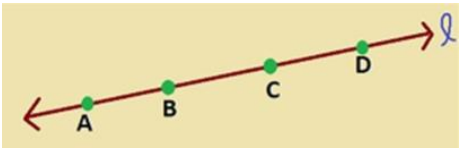
6) Perpendicular:



7) Coplanar:

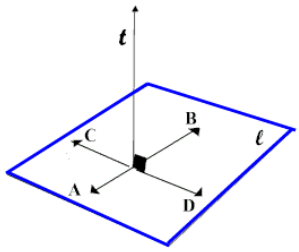


8) Collinear:



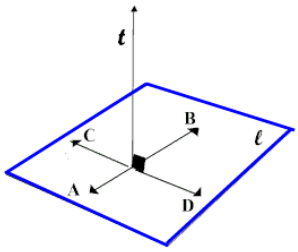
PLANE THEOREMS!!

1. If a line is perpendicular to a plane at a given point, it is perpendicular to every line in the plane which passes through that point.



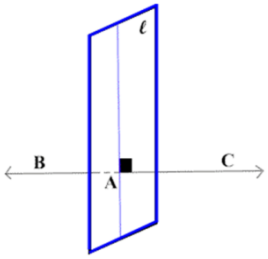
If $t \perp l$ then $t \perp AB$ and $t \perp CD$

2) If a line is perpendicular to each of two intersecting lines at their point of intersection, it is Also perpendicular to the plane which contains those lines.



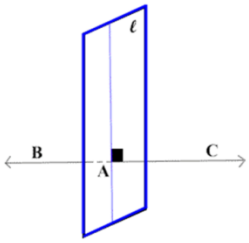
If $t \perp AB$ and $t \perp CD$ at the point of intersection then $t \perp l$

3. Given a point on a plane, there is only one line that can be drawn perpendicular to the plane that passes through the given point.



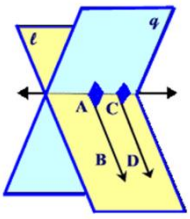
Given point A on plane l, only $BC \perp l$

4. Given a point NOT on a plane, there is only one line that can be drawn perpendicular to the plane that passes through the given point.



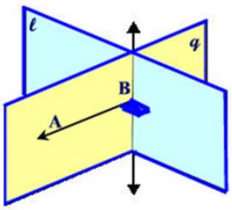
Given point B NOT on plane l, only $BAC \perp l$

5. Given two lines perpendicular to the same plane, the two lines are said to be coplanar (lie in the same plane.)



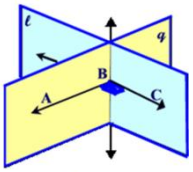
$AB \perp q$ and $CD \perp q$, then AB and CD are both contained in plane l

6. If one plane contains a line perpendicular to the second plane, then the two planes are perpendicular to each other.



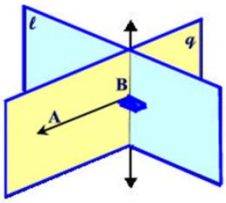
If $AB \perp l$, then $q \perp l$

7. If a given line is perpendicular to a plane, then any line that is perpendicular to the given line at its point of intersection with the given plane is in the given plane.



If $AB \perp l$, at point B, then $BC \perp AB$ at B, and B is contained in plane l

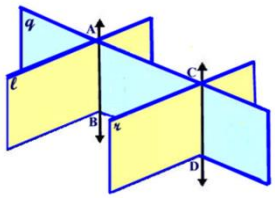
8. If a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given plane.



If $AB \perp l$, then $q \perp l$

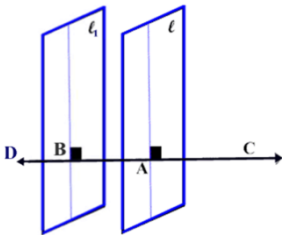
9. If a plane intersects two parallel planes, then the intersection is two parallel lines.

Note: The intersection of the two planes always forms a line.



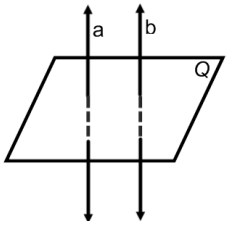
$If\ l \parallel r, then\ AB \parallel CD$

10. If two planes are perpendicular to the same line, then the given planes are parallel.

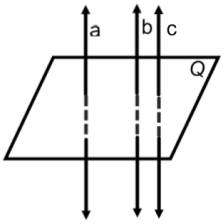


$If\ l \perp DC\ and\ l_1 \perp DC, then\ l \parallel l_1$

11. If two or more lines are perpendicular to the same plane, then the two lines are parallel to each other.



12. If two lines which intersect a plane are parallel to a third line which also intersects the plane, the lines are parallel to each other.



Examples:

1) If two points lie in a plane the line joining them also lies in the same plane

(a) True (b) False

2) Point P is on line m. What is the total number of planes that are perpendicular to line m and pass through point P.

(a) 1 (b) 2 (c) 0 (d) infinite

3) In three-dimensional space, two planes are parallel and a third plane intersects both of the parallel planes. The intersection of the planes is a:

(a) plane (b) point
(c) pair of parallel lines (d) pair of intersecting lines

4) Line k is drawn so that it is perpendicular to two distinct planes, P and R. What must be true about planes P and R?

(a) Planes P and R are skew (b) Planes P and R are parallel
(c) Planes P and R are perpendicular (d) Plane P intersects Plane R but is not perpendicular

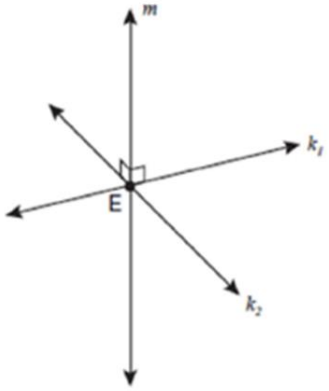
5) Given point P is on plane R. What is the total number of lines that can be drawn that are perpendicular to plane R and pass through point P.

(a) 1 (b) 2 (c) 0 (d) infinite

6) If two lines are perpendicular to the same plane they:

(a) are perpendicular (b) are parallel
(c) intersect but are not perpendicular (d) none of the above

7) Lines k_1 and k_2 intersect at point E. Line m is perpendicular to lines k_1 and k_2 at point E.



(a) Lines k_1 and k_2 are perpendicular
(b) Line m is parallel to the plane determined by lines k_1 and k_2
(c) Line m is perpendicular to the plane determined by lines k_1 and k_2
(d) Line m is coplanar with Lines k_1 and k_2

8) State the answer as either: parallel or perpendicular

If line AB and CD are parallel lines, and plane P is perpendicular to the line AB, then plane P must be

_____ to line CD.

Name:_____ Date:_____ Period:_____

Plane Geometry: Homework

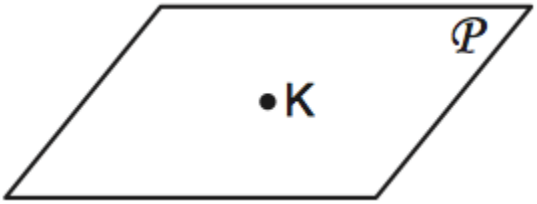
Complete the following questions below, circle your answer.

1.) Plane *P* is parallel to plane *Q*. If plane *P* is perpendicular to line *l*, then plane *Q*

(1) contains line *l.*
(2) is parallel to line *l.*
(3) is perpendicular to line *l.*
(4) intersects, but is not perpendicular to line *l*.

2.) In the diagram below, point *K* is in plane *P*. How many lines can be drawn through *K*, perpendicular to plane *P*.

(1) 1
(2) 2
(3) 0
(4) an infinite number



3.) If distinct plane *R* and *S* are both perpendicular to line *l*, which statement must always be true?

(1) Plane *R* is parallel to plane *S*.
(2) Plane *R* is perpendicular to plane *S*.
(3) Planes *R* and *S* and line *l* are all parallel.
(4) The intersection of planes *R* and *S* is perpendicular to line *l*.

4.) If line *l* is perpendicular to distinct planes *P* and *Q*, then planes *P* and *Q*

(1) are parallel.
(2) contain line *l*.
(3) are perpendicular.
(4) intersect, but are *not* perpendicular.

5.) Point A is on line *m*. How many distinct planes will be perpendicular to line *m* and pass through point A?

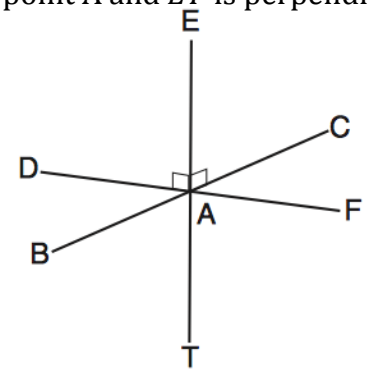
(1) one (2) two (3) zero (4) infinite

6.) Plane A and plane B are two distinct planes that are both perpendicular to line l. Which statement about planes A and B is true?

(1) Planes A and B have a common edge, which forms a line.
(2) Planes A and B are perpendicular to each other.
(3) Planes A and B intersect each other at exactly one point.
(4) Planes A and B are parallel to each other.

7.) As shown in the diagram below, $\overline{FD}$ and $\overline{CB}$ intersect at point A and $\overline{ET}$ is perpendicular to both $\overline{FD}$ and $\overline{CB}$ at A. Which statement is *not* true?

(1) $\overline{ET}$ is perpendicular to plane BAD.
(2) $\overline{ET}$ is perpendicular to plane FAB.
(3) $\overline{ET}$ is perpendicular to plane CAD.
(4) $\overline{ET}$ is perpendicular to plane BAT.



Review Questions:

8.) After the transformation $r_{y=x}$, the image of ΔABC is $\Delta A'B'C'$. If AB = 2x + 13 and A'B' = 9x – 8, find the value of x.

9.) In ΔABC, $m\angle A = x^2 + 12$, $m\angle B = 11x + 5$, and $m\angle C = 13x - 17$. Determine the longest side of ΔABC.