Al Mahdi High Schools (Al-Hadath)	Mathematics	10^{th}-Grade
Name:	"Space Geometry"	W.S-13

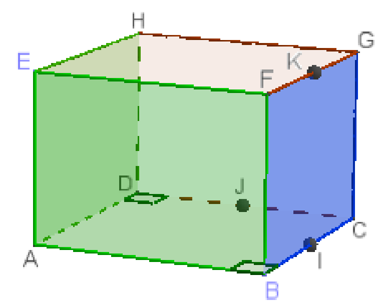
I- TRUE - FALSE questions:

A-

		True	False
1-	In a plane, two disjoint straight-lines are parallel		
2-	Two straight-lines parallel to the same plane are parallel		
3-	If *P* and *Q* are any two parallel planes, then every straight-line in the first is parallel to the second		
4-	In Cavalier's perspective, two segments of equal lengths are represented by segments having equal lengths		
5-	In Cavalier's perspective, a right angle is always represented by a right angle		

B- If *ABCDEFGH* is a cube, where *I*, *J*, *K* are the midpoints of [*BC*], [*CD*] and [*FG*] respectively, then

		True	False
1-	(*IJK*) and (*AEH*) are parallel		
2-	(*IJ*) and (*BD*) are parallel		
3-	(*AC*) and (*EF*) are parallel		
4-	(*IK*) and (*GH*) are skew		
5-	(*IK*) and (*HD*) are non-coplanar		
6-	(*IJK*) and (*EFG*) have only one point in common		
7-	(*IJ*) and (*AF*) are parallel		
8-	(*EG*) and (*AB*) are parallel		
9-	(*IK*) and (*AE*) are skew		
10-	(*IK*) and (*CD*) are non-coplanar		



C-

		True	False
1-	In space, two disjoint straight-lines are parallel		
2-	Two straight-lines parallel to a third straight-line are parallel		
3-	If a straight-line is parallel to a plane, then it is parallel to every straight-line in this plane		
4-	In Cavalier's perspective, a square is always represented by a square		
5-	In Cavalier's perspective, two parallel straight-lines are represented by parallel straight-lines		

D- Answer by true or false and justify your answer.

1) If A & B are two points of a plane (P), then every point M of the straight-line (AB) belongs to (P).
2) A point and a straight-line always determine a plane.
3) If three points are in two planes at the same time, then they are collinear.

II- Consider the pyramid $SABCD$, whose base is the parallelogram $ABCD$ of center O. Let I & J be the respective midpoints of $[SB]$&$[SC]$.

1. Determine with justification the following intersections of the plane:
   a. (ABC) with the plane (ACD).
   b. (BED) with the straight line (AO).
   c. (ABD) with the plane (AEC).
2. a) Show that the straight lines (IJ)&(ED) are parallel.
   b) Deduce the intersection of the planes (ABC)&(EID).
3. Show that the straight line (IJ) is parallel to the plane (BCD).

III- Let $ABCDEFGH$ be a rectangular prism and I and J be the centers of the faces $ADHE$ and $BCGF$ respectively.

1) What are, graphically, the straight-lines parallel to (IJ)?
2) Indicate a straight-line which is non-coplanar with (IJ).
3) What is the relative position of the planes:
   a) (ABF) and (AIJ)?
   b) (ABF) and (HGC)?
   c) (BCG) and (CFI)?
4) Indicate two secant planes parallel to (IJ).
5) Indicate two straight-lines parallel to plane (EFC).
6) What is the relative position of (IJ) with respect to plane (EDC)?

IV- Let $ABCD$ be a tetrahedron. I is a point of [BD] such that $\overrightarrow{BI}=\frac{3}{4}\overrightarrow{BD}$, J is the midpoint of [AC] and K is a point of [AD] such that $\overrightarrow{AK}=\frac{2}{3}\overrightarrow{AD}$.

1) Draw the figure and locate I, J and K.
2) Find the intersection between the two planes (AIJ) and (ACD) and the two planes (AIJ) and (BCD). (Justify your answer)
3) Construct the intersection between the two planes (IJK) & (BCD) and the two planes (IJK) and (ABC). (Justify your answer)

V- Consider a tetrahedron $ABCD$. Let I, J and K be three points on]AB[,]AC[&]AD[respectively. (IJ) cuts (BC) in E and (JK) cuts (CD) in F.

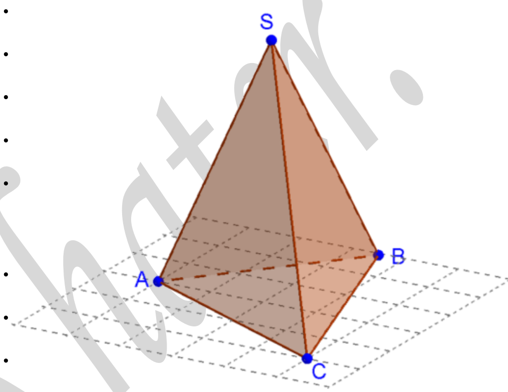
1) If (IK) cuts (BD) in G, show that the points E, F and G are collinear.
2) If (IK) is parallel to (BD), show that (EF) is parallel to (BD).
3) Precise the intersection between the two planes (ABD) and (AEF).

VI- Construct with justification the intersections in each of the following cases:

A. Given: I is $midpt$ of $[SA]$, $\overrightarrow{CJ} = \frac{1}{4}\overrightarrow{CS}$ & $\overrightarrow{BK} = \frac{3}{4}\overrightarrow{BS}$.

Determine:

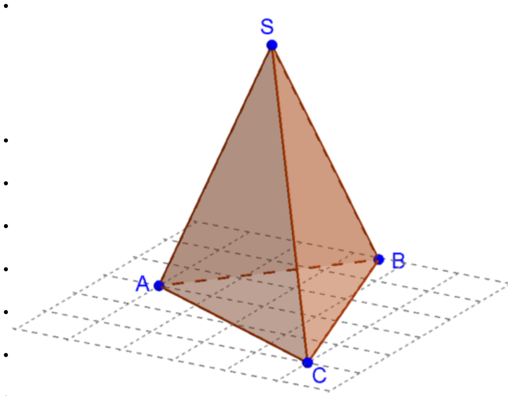
a) $(IJ) \cap (ABC)$



b) $(IJK) \cap (ABC)$

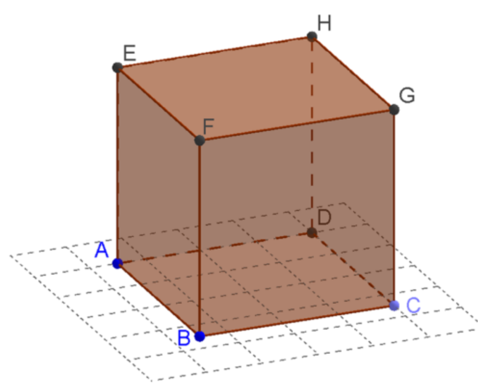
B. Given: $I \in (SBC)$

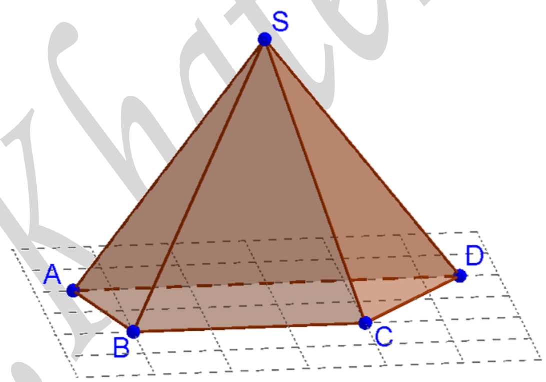
Determine $(SAI) \cap (ABC)$



C. Given: $I = (BG) \cap (FC)$

Determine $(BGH) \cap (FCH)$



Given: $I \in (SCD)$ P is the midpt of $[SA]$, $\overrightarrow{CJ} = \frac{1}{4}\overrightarrow{CS}$	Question	Answer	Construction
	1) $(SAI) \cap (ABC)$		
	2) $(SAB) \cap (SCD)$		
	3) $(SAD) \cap (SBC)$		
	4) $(PJ) \cap (ABC)$		

Mastering problems		
Chapter	*Exercises*	*Pages*
CH-: Space Geometry	2,3 & 4	408
	6	409
	11 & 14	411