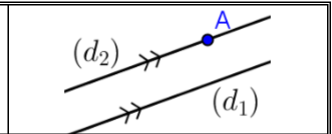
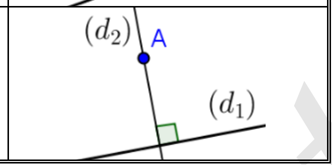
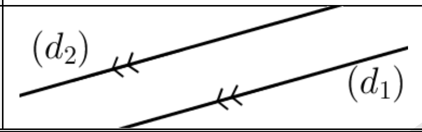
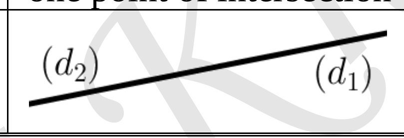
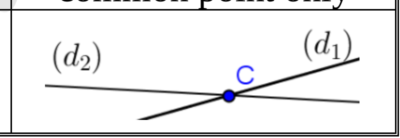
Lycée Des Arts | *Mathematics* | *8th-Grade*

Name: . . . . . . *"All about relative positions of lines in a plane"* *E.S-4*

I- *Euclidian postulates*: From any point "A" distinct (outside) from a straight line (d_1), we can draw *one and only one* straight line (d_2)

a) Parallel to (d1).	
b) Perpendicular to (d_1).	

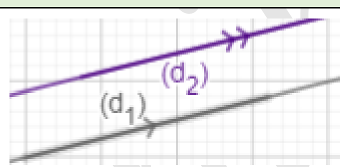
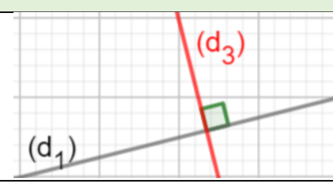
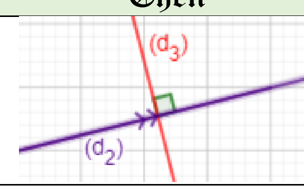
II- *Relative positions of straight lines in a plane:* Any set of straight lines in a plane can be

	Parallel	*Confounded*	*Intersecting*
Analytically	if there is no point of intersection between them	if they admit more than one point of intersection	if they admit one common point only
Graphically			

III- *How to prove two straight lines Perpendicular* ?

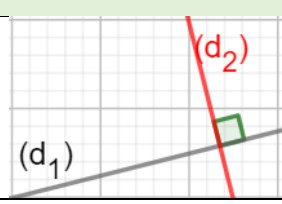
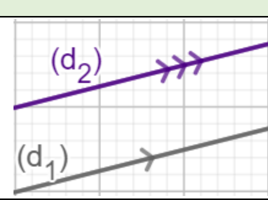
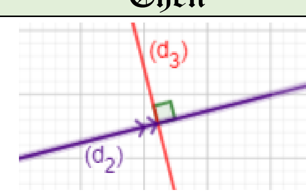
i- If (d_1) & (d_2) are any two parallel lines, then every line (d_3) perpendicular to (d_1) is perpendicular to (d_2).

***Thus**, a st. line perpendicular to one of two parallel lines is perpendicular to the other.*

	If			Then
Graphically		and		
Algebrically	$\left.\begin{matrix}(d_1)\parallel(d_2)\\(d_1)\perp(d_3)\end{matrix}\right\}$			$(d_2)\perp(d_3)$

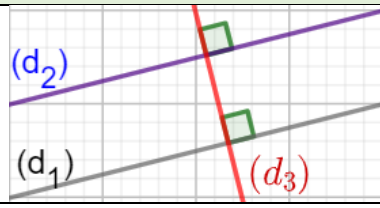
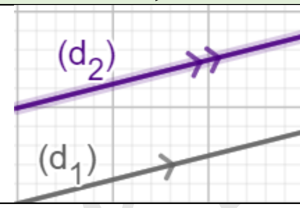
ii- If (d_1) & (d_2) are any two perpendicular lines, then every line (d_3) parallel to (d_1), is perpendicular to (d_2).

***Thus**, a st. line parallel to one of two perpendicular lines is perpendicular to the other.*

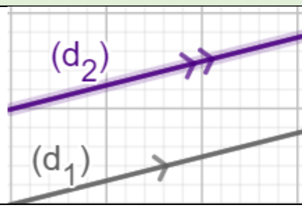
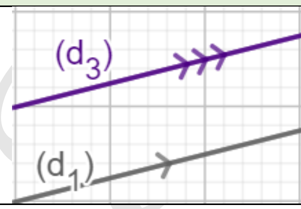
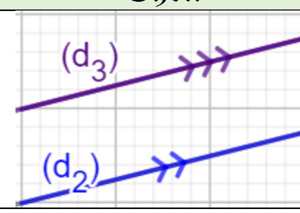
	If			Then
Graphically		and		
Algebrically	$\left.\begin{matrix}(d_1)\perp(d_2)\\(d_1)\parallel(d_3)\end{matrix}\right\}$			$(d_2)\perp(d_3)$

IV- *How to prove two straight lines parallel*?

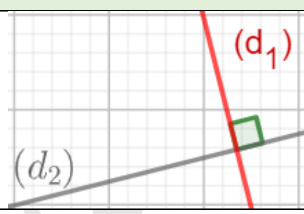
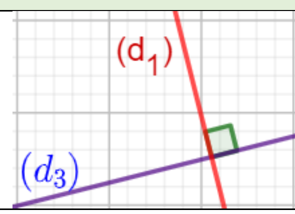
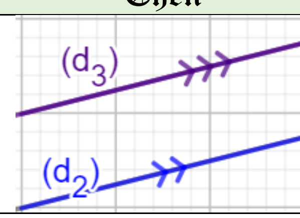
a- If (d_1) & (d_2) are perpendicular to a third line (d_3), then (d_1) and (d_2) are parallel.
***Thus**, two st. lines perpendicular to a third line are parallel.*

	If	Then
Graphically		
Algebrically	$\left.\begin{array}{l}(d_1)\perp(d_3)\\(d_2)\perp(d_3)\end{array}\right\}$	$(d_1)\parallel(d_2)$.

b- If (d_1) & (d_2) are any two parallel lines, then every line (d_3) parallel (d_1), is parallel to (d_2).
***Thus**, a st. line parallel to one of two parallel lines is parallel to the other.*

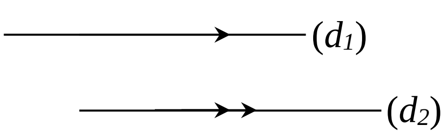
	If	Then
Graphically	 and 	
Algebrically	$\left.\begin{array}{l}(d_1)\parallel(d_2)\\(d_1)\parallel(d_3)\end{array}\right\}$	$(d_2)\parallel(d_3)$.

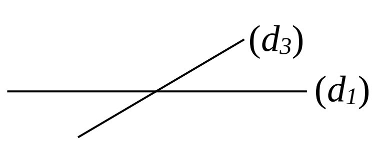
c- If (d_1) & (d_2) are any two perpendicular lines, then every line (d_3) perpendicular to (d_1) is parallel to (d_2).
***Thus**, a st. line perpendicular to one of two perpendicular lines is parallel to the other.*

	If	Then
Graphically	 and 	
Algebrically	$\left.\begin{array}{l}(d_1)\perp(d_2)\\(d_1)\perp(d_3)\end{array}\right\}$	$(d_2)\parallel(d_3)$.

V- *How to prove two straight lines intersecting*?

If (d_1) & (d_2) are any two parallel lines, then every line (d_3) intersects (d_1), must intersect (d_2).
***Thus**, a st. line intersecting one of two parallel lines intersects the other.*





, then