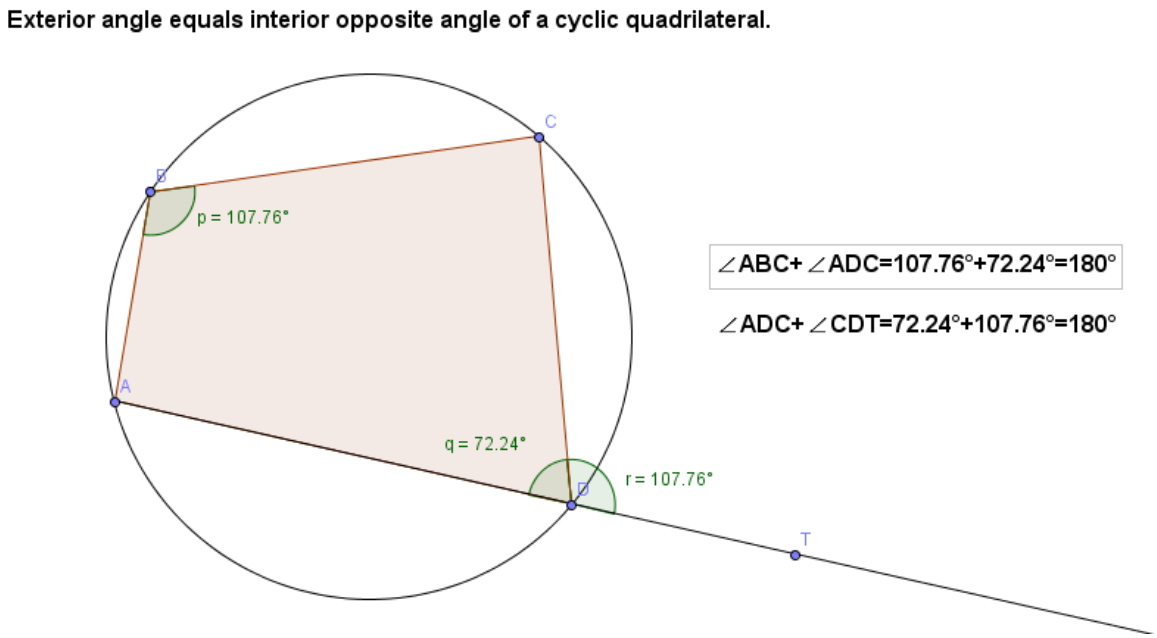
Task A: <u>Exterior Angle of Quadrilateral</u>

To create a dynamic worksheet that illustrates an exterior angle of cyclic quadrilateral equals the interior opposite angle.



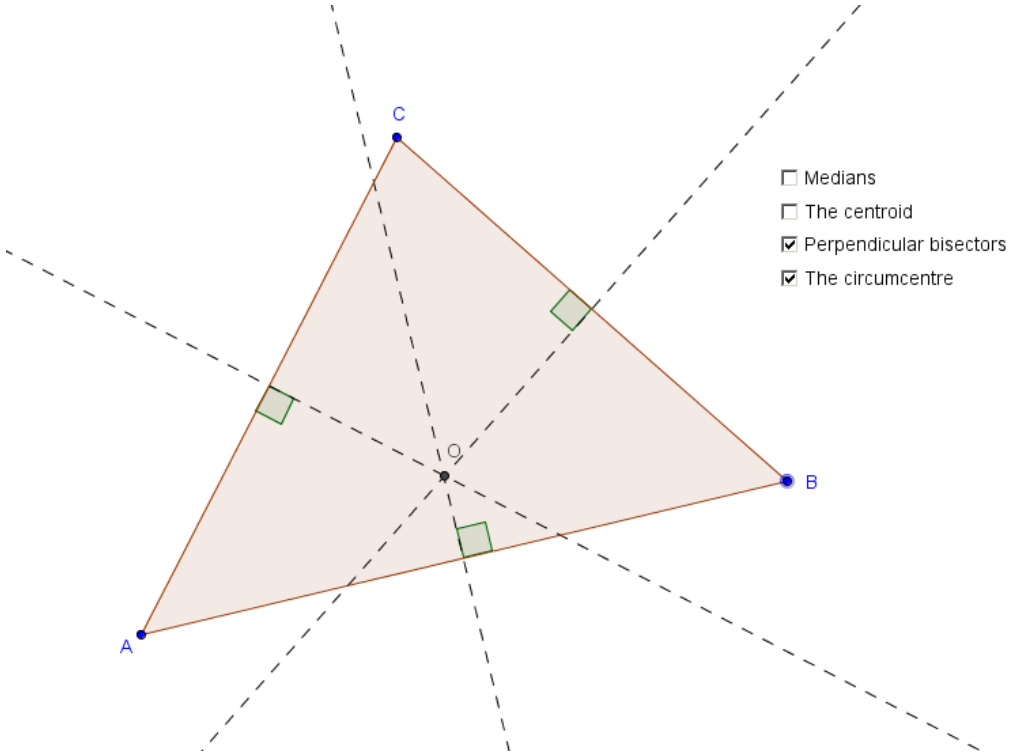
Create objects on the Graphics window as follows:

Steps	Objects to be created	Action
1.	A circle	◆ Select  "Circle with center through point" and click on the Graphics window for two times to create a circle ◆ Rename A and B as O and M respectively ◆ Right click on points O and M and deselect "Show Object" to hide the points
2.	Four points A,B,C and D on the circle	◆ Select  "New Point" ◆ Click on the circle for four times in a clockwise direction to create the points
3.	Polygon ABCD	◆ Select  "Polygon" ◆ Click on points A, B, C, D and then A again ◆ Right click on the polygon and deselect "Show label" if you see the label of the polygon

Steps	Objects to be created	Action
4.	Ray from A through D	◆ Select  "Ray through Two Points" ◆ Click on points A and D
5.	Point T	◆ Select  "New Point" ◆ Click on the part of the ray outside the circle and rename the point as T
6.	Angles p, q and r	◆ Select  "Angle" ◆ Click on points A, B, C, then C, D, A, and then T, D, C (all in clockwise direction) ◆ Rename the angles as p, q and r respectively ◆ Right click on the angles and choose "Object Properties", then check the option "Show Label" and select "Name and Value"
7.	Text T1	◆ Select  "Insert text:" ◆ Click on the Graphics window ◆ Type ∠ABC + ∠ADC = p + q = p + q = p+q Remarks: - Select "∠" from "Symbols" - Select p and q from "Objects" - To type p+q, start from p and click beside p to bring the cursor into the box, then type "+q"
8.	Text T2	◆ Select  "Insert text:" ◆ Click on the Graphics window ◆ Type ∠ADC + ∠CDT = q + r = q + r = q+r
9.	Text T3	◆ Select  "Insert text:" ◆ Click on the Graphics window and type "Exterior angle equals interior opposite angle of a cyclic quadrilateral" ◆ Right click on the text, click "Object Properties" and click on "Position" and check the box "Absolute Position on Screen"

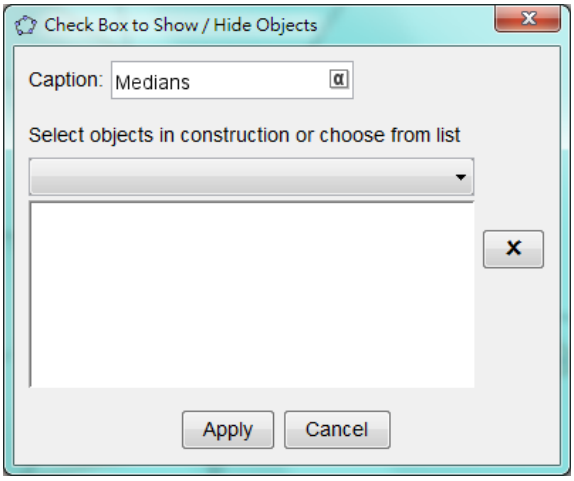
Task B: <u>Centers of Triangle</u>

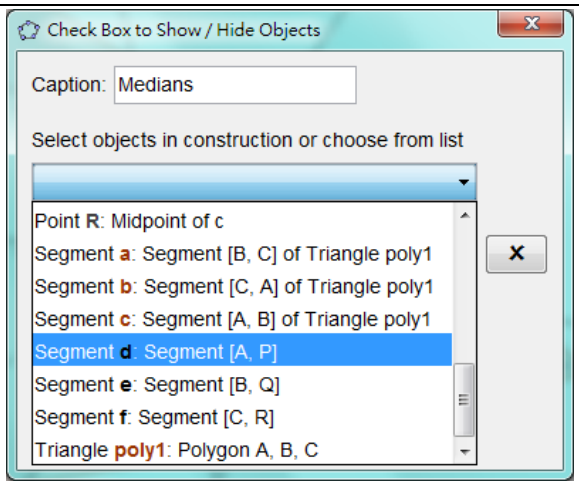
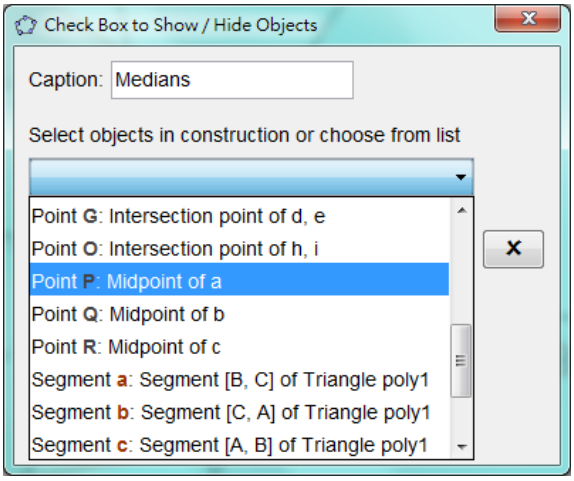
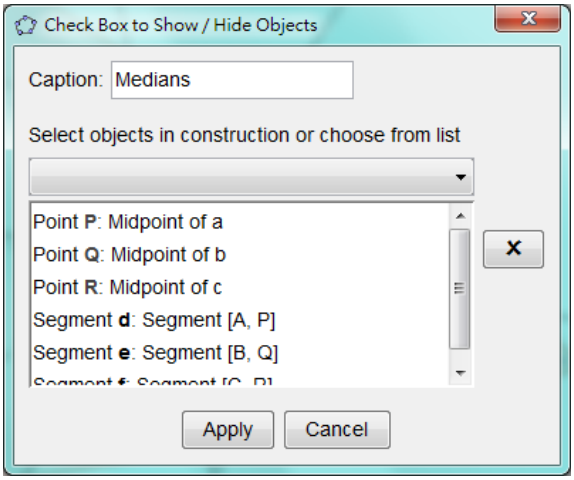
To create a dynamic worksheet that shows the collinearity of the centroid and circumcenter of an arbitrary triangle.

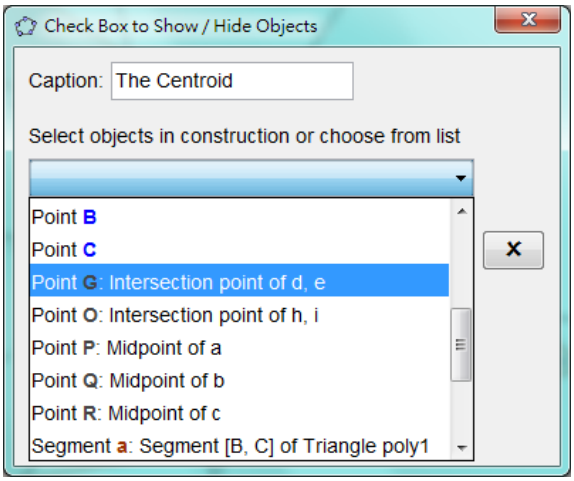
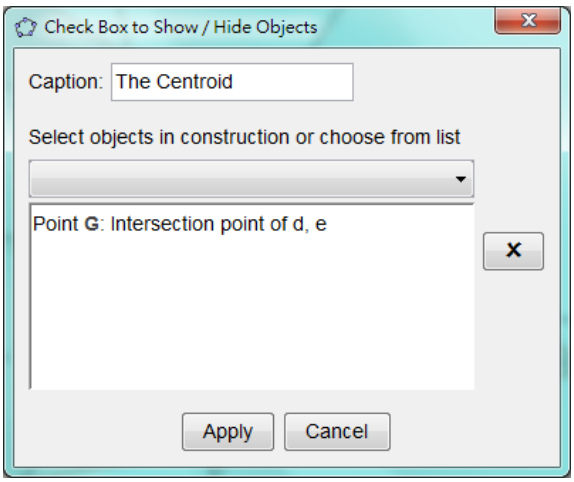


Create objects on the Graphics window as follows:

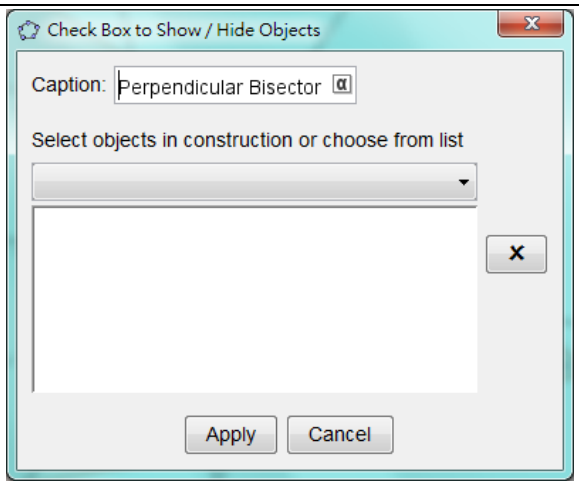
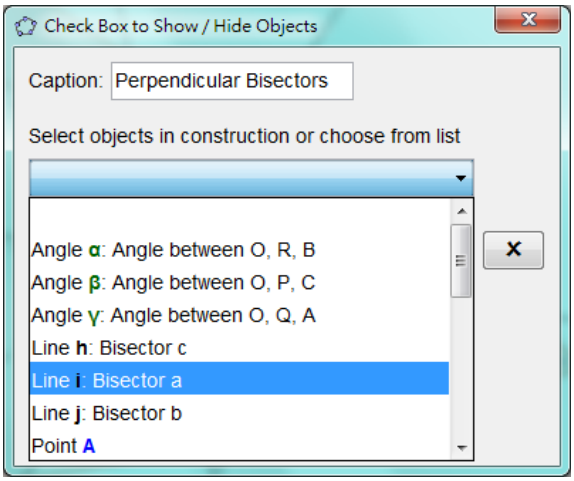
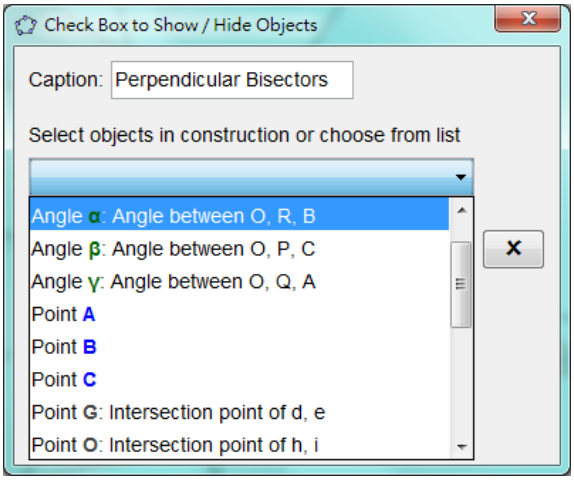
Steps	Objects to be created	Action
1.	Triangle ABC	◆ Select  "Polygon" ◆ Click on the Graphics window at any three points in anti-clockwise direction and then back to the first point
2.	Medians AP, BQ and CR and the centroid G	Medians: ◆ Select  "Midpoint or Center" ◆ Click on segments AB, BC and CA to create the mid-points of the three sides ◆ Right click on the mid-points of BC, CA, and AB and rename the points as P, Q and R ◆ Select  "Segment between Two Points" ◆ Click on points A and P, B and Q, C and R to create the medians

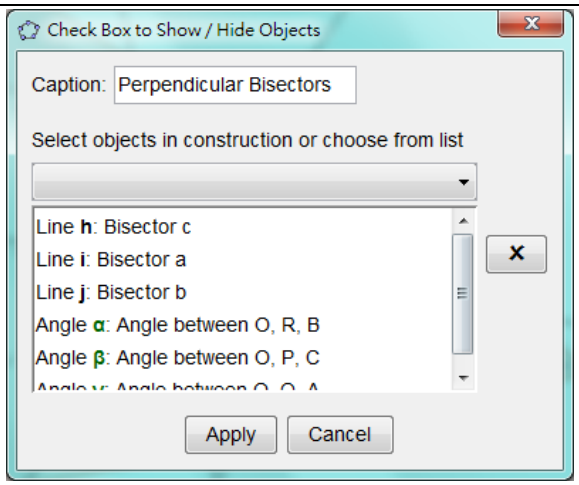
Steps	Objects to be created	Action
		◆ Select  "Move" ◆ While holding the Ctrl key, click on AP, BQ and CR ◆ Right click on any one of the lines and click "Object properties" ◆ Click on "Style" and change the line type to dashed line, then click the cross button to close the dialog box Centroid: ◆ Select  "Intersect Two Objects" ◆ Click on the intersection point of the lines AP, BQ and CR ◆ Right click on the new point and rename it as G
3.	Check boxes to show/hide the medians and centroid	Show/hide Medians ◆ Select  "Check Box to Show/Hide Objects" ◆ Click on the Graphics window ◆ In the "Caption" field, enter "Medians"  ◆ Click on the small black triangle and select segments AP, BQ and CR

Steps	Objects to be created	Action
		 and points P, Q and R   ◆ Click “Apply” ◆ Right click on the text of the check box and click “Object Properties” ◆ Check the box “Fix Checkbox”

Steps	Objects to be created	Action
		Show/hide the Centroid ◆ Select  "Check Box to Show/Hide Objects" ◆ Click on the Graphics window ◆ In the "Caption" field, enter "The centroid" ◆ Click on the small black triangle and select Point G   ◆ Click "Apply" ◆ Right click on the text of the check box and click "Object Properties" ◆ Check the box "Fix Checkbox"
4.	Perpendicular bisectors and the circumcentre O	Perpendicular Bisectors: ◆ Select  "Perpendicular Bisector" ◆ Click on the segments AB, BC and CA to create the perpendicular bisectors

Steps	Objects to be created	Action
		◆ Select  "Move" ◆ While holding Ctrl key, click on the three perpendicular bisectors ◆ Right click on any one of the lines and click "Object properties" ◆ Click on "Style" and change the line type to dashed line, then click the cross button to close the window Circumcentre: ◆ Select  "Intersect Two Objects" ◆ Click on the intersection point of the perpendicular bisectors ◆ Right click on the new point and rename it as O Mark the right angles: ◆ Select  "Angle" ◆ Click on segment AB and them its perpendicular bisector ◆ Click on segment BC and them its perpendicular bisector ◆ Click on segment CA and them its perpendicular bisector ◆ Right click on the right angles and deselect "Show Label"
5.	Check box to show/hide the perpendicular bisectors and the circumcentre	Show/hide Perpendicular Bisectors ◆ Select  "Check Box to Show/Hide Objects" ◆ Click on the Graphics window ◆ In the "Caption" field, enter "Perpendicular bisectors"

Steps	Objects to be created	Action
		 ◆ Click on the small black triangle and select Bisector a, b and c  and angles α, β and γ 

Steps	Objects to be created	Action
		 ◆ Click "Apply" ◆ Right click on the text of the check box and click "Object Properties" ◆ Check the box "Fix Checkbox" Show/hide the Circumcentre ◆ Select  "Check Box to Show/Hide Objects" ◆ Click on the Graphics window ◆ In the "Caption" field, enter "The circumcentre" ◆ Click on the small black triangle and select Point O ◆ Click "Apply" ◆ Right click on the text of the check box and click "Object Properties" ◆ Check the box "Fix Checkbox"