Running Circles Around Quads
ID: 12144

Time Required
15 minutes

Activity Overview
In this activity, students will explore various properties of cyclic quadrilaterals.

Topic: Quadrilaterals & General Polygons
- *Cyclic Quadrilaterals*

Teacher Preparation and Notes
- *To complete this activity, students will need to know how to change between pages, grab and move points.*
- *The multiple-choice items are self-check and students can check them by pressing* (ctrl) + ▲.
- ***To download the student TI-Nspire document (.tns file) and student worksheet, go to education.ti.com/exchange and enter "12144" in the quick search box.***

Associated Materials
- *CirclesAroundQuads_Student.doc*
- *CirclesAroundQuads.tns*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.
- *Opposite Angles in Cyclic Quadrilaterals (TI-84 Plus family) — 6800*
- *Cyclic Quadrilaterals (TI-Nspire technology) — 9691*
- *Cyclic Quadrilaterals (TI-89 Titanium) — 4598*

Problem 1 – Properties of Cyclic Quadrilaterals

Students will begin this activity by looking at properties of cyclic quadrilaterals. They will discover that opposite angles are supplementary.

Students will be asked to collect data when *Q* is on the circle and then be asked to collect data when they redefine *Q* to be a point not on the circle. Students will need to use the **Redefine** tool (**MENU > Actions > Redefine**). To redefine the point, students will need to move to point *Q* and press (enter), then move to a point outside of the circle and press (enter) again.

Finally, students will be asked several *always-sometimes-never* questions. Students should use the properties of opposite angles to select the correct choice.
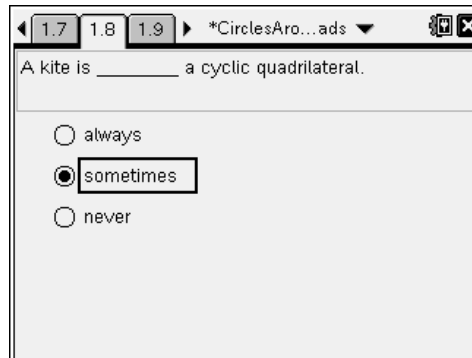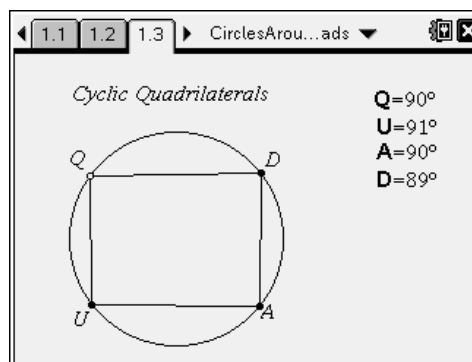
Problem 2 – Extension

In Problem 2, students can discover properties of angles created by the diagonals of a cyclic quadrilateral.

On page 2.2, students are given the measure of angles *Q*, *U*, *A*, *D*, *DQA*, and *DUA*. They should move point *Q* to four different points and collect data in the table on the accompanying worksheet.
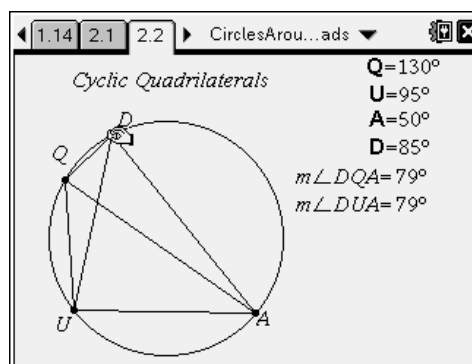
Student Solutions

1. Sample answers:

Position	∠Q	∠U	∠A	∠D
1	91	89	89	91
2	91	107	89	73
3	91	119	89	61
4	91	54	89	126

2. Opposite angles are supplementary.

3. Sample answers:

Position	∠Q	∠U	∠A	∠D
1	73	107	89	91
2	76	95	89	100
3	81	78	89	112
4	117	65	89	88

4. No relationship exists.

5. sometimes

6. sometimes

7. always

8. sometimes

9. always

10. always

11. sometimes

12. Sample answers:

Position	∠Q	∠U	∠A	∠D	∠DQA	∠DUA
1	102	95	78	85	51	51
2	94	95	106	105	43	43
3	72	95	108	105	21	21
4	130	95	50	85	79	79

13. They are congruent.