Name _____

Date _____

EXPLORATIONS

Activity 18

Relationship of Angles to the Circle

Construct the geometric object by following the instructions below, and then answer the questions about the object.

1. Create a circle *P*.
   a. From the Curves Toolbar, select **Circle**.
   b. Move the pointer to the screen. Click once and type *P*.
   c. Drag, then click again.
2. Create an inscribed angle from two secants.
   a. From the Lines Toolbar, select **Line**.
   b. Move the pointer to the circle until the message ***On this circle*** appears. Click once and type *A*.
   c. Drag to the other side of the circle until the message ***On this circle*** appears. Click once and type *B*.
   d. From the Lines Toolbar, select **Line**.
   e. Move the pointer to point *A* until the message ***This point*** appears. Click once.

f. Drag the point to the other side of the circle until the message ***On this circle*** appears. Click once and type *C*.

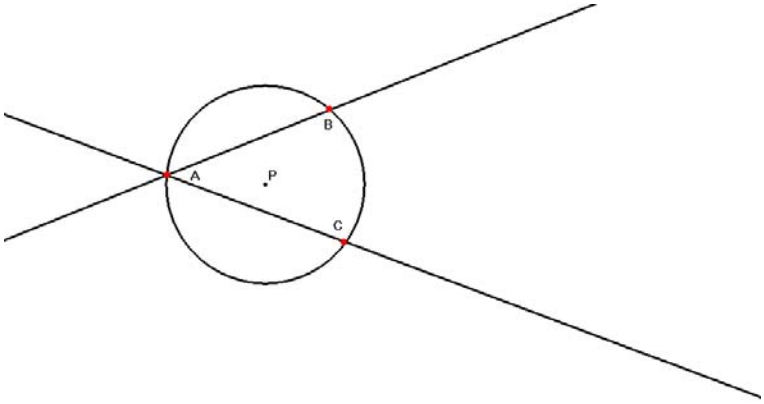

Figure 18.1

3. Measure and label $\angle BAC$.

4. Measure arc *BC*. (This will only work if arc *BC* is minor. If it does not measure correctly, take the measure given and subtract from 360 to get the true arc measurement.)

a. From the Measures Toolbar, select **Angle**.

b. Click on *B*, *P* and then *C* (the central angle).

c. Type **m arc BC**.

d. From the Pointer Toolbar, select **Pointer**.

e. Move the pointer to m arc *BC* and drag close to the arc.

5. What do you notice about the intercepted arc and the inscribed angle? (Use the Calculate Toolbar if necessary.)

_____

6. Alter the angle.

a. From the Pointer Toolbar, select **Pointer**.

b. Move the pointer to point *B* until the message ***This point*** appears. Click once and drag.

7. Have the results changed?

_____

8. Alter the angle several more times make it acute and right.

9. What can you conclude about the intercepted arc and the inscribed angle?

_____

10. Clear the screen.

11. Construct an interior angle from two secants.

- **a.** Create a circle Q.
- **b.** From the Lines Toolbar, select **Line**.
- **c.** Move the pointer to the circle until the message ***On this circle*** appears. Click once and type R.
- **d.** Drag to the other side of the circle until the message ***On this circle*** appears. Click once and type S.
- **e.** Move the pointer to the circle until the message ***On this circle*** appears. Click once and type M.
- **f.** Drag to the other side of the circle (so that the two lines intersect inside the circle) until the message ***On this circle*** appears. Click once and type N.
- **g.** Find the intersection point and label it T.

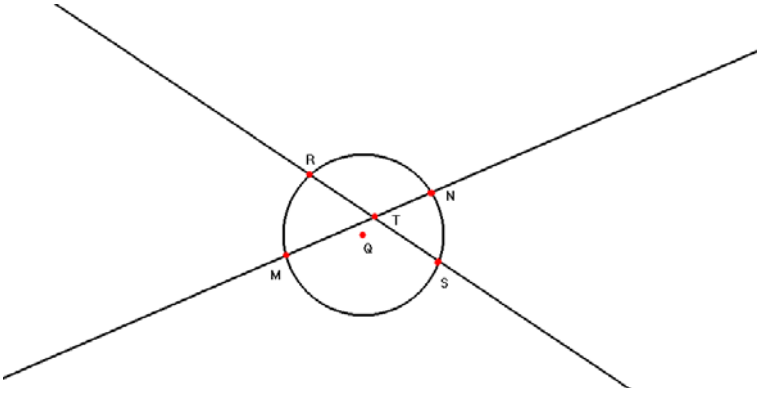

Figure 18.2

12. Measure and label $\angle MTS$.

13. Measure the intercepted arcs of $\angle MTS$.

- **a.** Measure and label arc MS by measuring $\angle MQS$. (Remember, if it is a major arc, subtract from 360 to receive the true measurement.)
- **b.** Measure and label arc RN by measuring $\angle RQN$.

14. Complete the table below.

M∠MTS	sum of arcs MS and RN	difference of arcs MS and RN

15. Is there a relationship between the angle and the sum or difference of the intercepted arcs?

_____

16. Alter the angle, then complete the table below.

m∠MTS	sum of arcs MS and RN	difference of arcs MS and RN

17. What can you conclude about the interior angle and its intercepted arcs?

_____

18. Clear the screen.

19. Create an exterior angle.

- **a.** Create a circle O.
- **b.** From the Lines Toolbar, select **Line**.
- **c.** Move the pointer to the circle until the message **On this circle** appears. Click once and type A.
- **d.** Drag to another point on the circle. Click once and type B.
- **e.** Move the pointer to the circle until the message ***On this circle*** appears. Click once and type C.
- **f.** Drag to another point on the circle. Click once and type D.
- **g.** Drag line $\overline{AB}$ so that it intersects line $\overline{CD}$ outside the circle.
- **h.** Find the intersection point of lines $\overline{AB}$ and $\overline{CD}$ and label it X.

20. Measure $\angle AXC$ and the intercepted arcs AC and BD.

- **a.** Remember, to measure arc AC, measure $\angle AOC$.
- **b.** To measure arc BD, measure $\angle BOD$.

21. Complete the table below. Alter the angle several times.

m∠AXC	sum of arcs AC and BD	difference of arcs AC and BD

22. What can you conclude about the exterior angle and its intercepted arcs?

_____