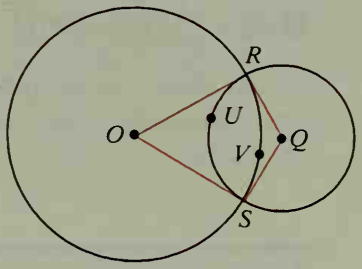
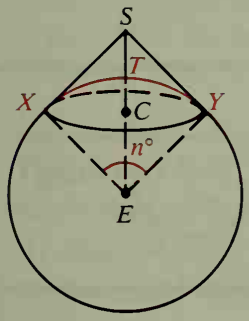
C **21.** Given: $\odot O$ and $\odot Q$ intersect at R and S;
$m\overset{\frown}{RVS} = 60$; $m\overset{\frown}{RUS} = 120$
Prove: $\overline{OR}$ is tangent to $\odot Q$;
$\overline{QR}$ is tangent to $\odot O$.



22. Given: $\overline{AB}$ is a diameter of $\odot Z$; points J and K lie on $\odot Z$ with $m\overset{\frown}{AJ} = m\overset{\frown}{BK}$. Discover and prove something about $\overline{JK}$. (*Hint*: There are two possibilities, depending on whether $\overset{\frown}{AJ}$ and $\overset{\frown}{BK}$ lie on the same side of $\overline{AB}$ or on opposite sides. So your statement will be of the *either . . . or* type.)

The diagram, not drawn to scale, shows satellite S above the Earth, represented as sphere E. All lines tangent to the Earth from S touch the Earth at points on a circle with center C. Any two points on the Earth's surface on or above that circle can communicate with each other via S. X and Y are as far apart as two communication points can be. The Earth distance between X and Y equals the length of $\overset{\frown}{XTY}$, which equals $\frac{n}{360} \cdot$ circumference of the Earth. That circumference is approximately 40,200 km and the radius of the Earth is approximately 6400 km.



23. The photograph above shows the view from Gemini V looking north over the Gulf of California toward Los Angeles. The orbit of Gemini V ranged from 160 km to 300 km above the Earth. Take S to be 300 km above the Earth. That is, $ST = 300$ km. Find the Earth distance, rounded to the nearest 100 km, between X and Y. (*Hint*: Since you can find a value for $\cos \frac{n°}{2}$ you can determine $n°$.)

24. Repeat Exercise 23, but with S twice as far from the Earth. Note that the distance between X and Y is not twice as great as before.