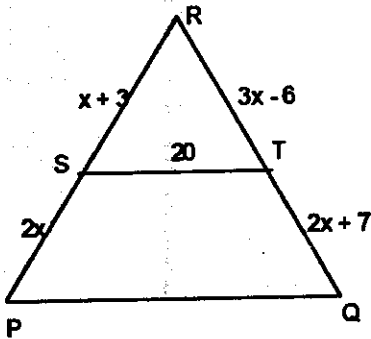
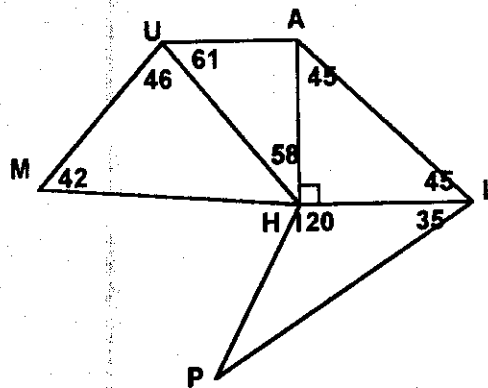


1. In the figure $\overline{ST} \parallel \overline{PQ}$, $ST = 20$, find the perimeter of $\triangle PRQ$.



2. Which segment is the shortest in the entire figure? (The figure is not drawn to scale.)

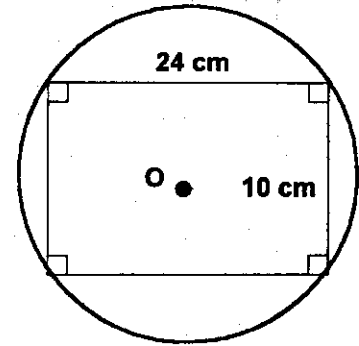


3. To the nearest degree, find the measure of $\angle A$ in $\triangle BAT$ if $m\angle B = 31^\circ$, $AT = 36$, and $AB = 19$.

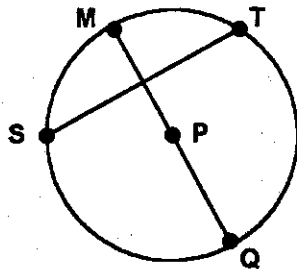
4. A horse is tied, with a 15' rope, to the corner of a barn that is 12' X 10'. If the barn was removed, the horse could eat a circular area. With the barn in place, how much area of the original amount of the circle can the horse NOT reach? Give an exact answer.

5. The angle of elevation from a ship to the top of a 36m lighthouse on the shore is 19° . To the nearest meter, how far is the ship from the shore?

6. Find the circumference of circle O. Leave your answer in terms of π .

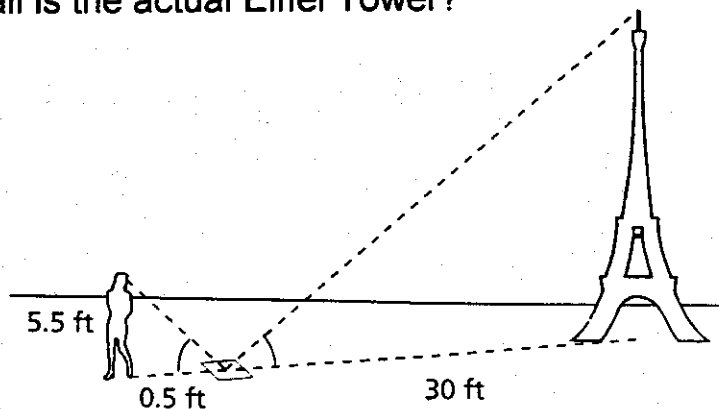


7. Two and a half centimeters from the end of a 95 cm diameter of a circle, the diameter intersects a chord and splits the chord into two segments, one of which has length 10 cm. How long is the chord?
8. \overline{MQ} is a diameter of circle P. \overline{ST} is the perpendicular bisector of \overline{MP} and $PQ = 2$. Find ST .

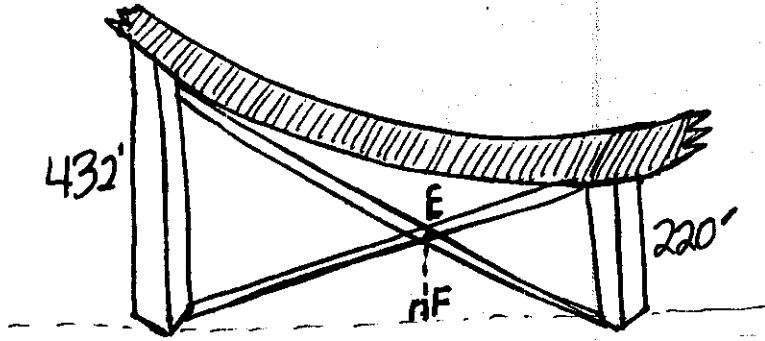


9. Write the equation of a circle with center $(-3,4)$ which is tangent to the x-axis. Put your answer in the form $x^2 + y^2 + Dx + Ey + F = 0$.

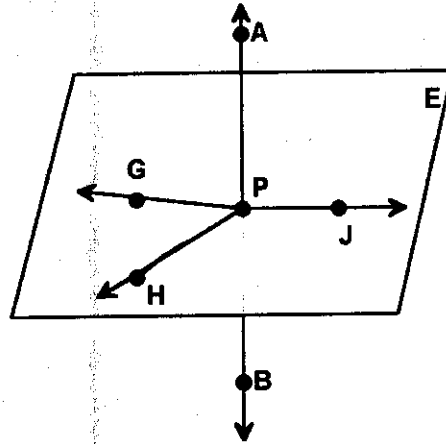
10. You are visiting Kings Dominion Amusement Park in Doswell Virginia. The park has a smaller scale model of the Eiffel Tower. The scale factor is 1:3. Using the picture, how tall is the actual Eiffel Tower?



11. A portion of an amusement ride called "the loop" is shown. Find the length of \overline{EF} . Round your answer to the nearest thousandths.



12. Given that G, H, J and P are in plane E and $\overleftrightarrow{AB} \perp E$ at P. Correctly name all different right angles to the picture.



13. A cylindrical bale of hay is 7 ft. in diameter and has a height of 6 ft. What is the total volume of 3 bales of hay? Leave your answer in terms of π .
14. An ice cream cone has an opening diameter of 90 millimeters and a height of 100 millimeters. A spherical scoop of ice cream is placed on top of the cone --- half in the cone and half is outside the cone. How much empty space is in the cone?
15. List four of the five names of the points of concurrency of a triangle in alphabetical order.