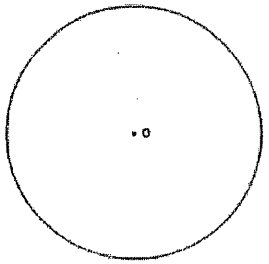
Name:_____ Period:_____

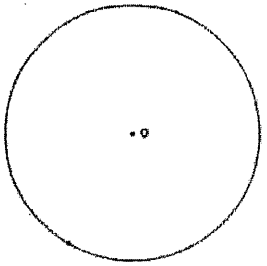
Hexagon Inscribed in a Circle

http://www.mathopenref.com/constinhexagon.html

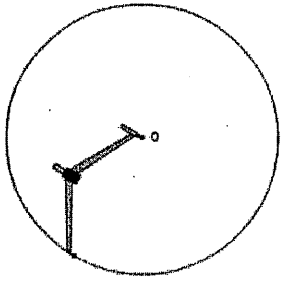
Start:
Given a circle with center *O*, construct a hexagon inscribed in the circle.



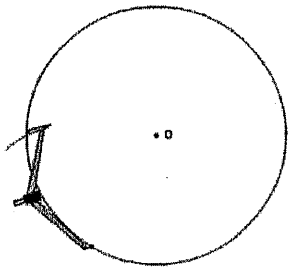
1. Mark a point anywhere on the circle. This will be the first vertex of the hexagon.



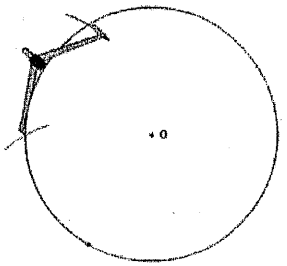
2. Set the compass on this point and set the width of the compass to the center of the circle, so the length of the compass is the radius of the circle.



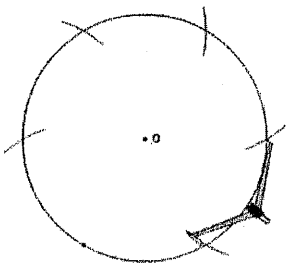
3. Make an arc across the circle. This will be the next vertex of the hexagon.



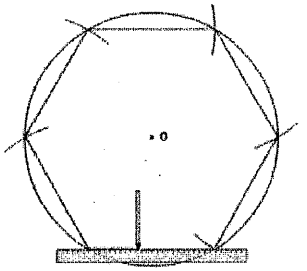
4. Move the compass on the next vertex and draw another arc. This is the third vertex of the hexagon.



5. Continue this way until you have all six vertices.



6. Draw a line between each successive pairs of vertices, for a total of six lines.

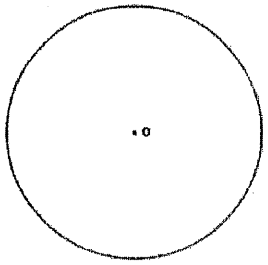


Done!

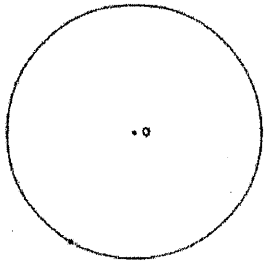
You have constructed a hexagon!

Equilateral Triangle Inscribed in a Circle

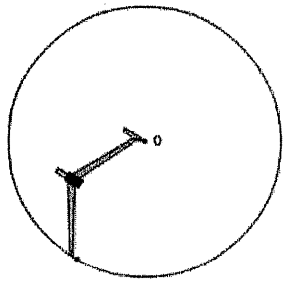
Start:
Given a circle with center *O*, construct an equilateral triangle inscribed in the circle.



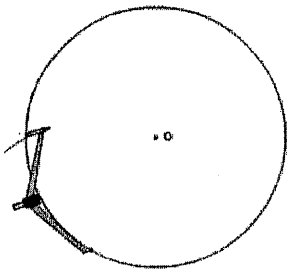
1. Mark a point anywhere on the circle. This will be the first vertex of the equilateral triangle.



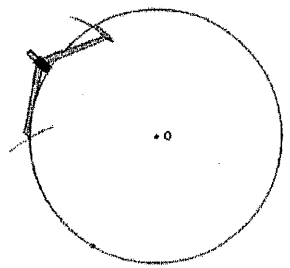
2. Set the compass on this point and set the width of the compass to the center of the circle, so the length of the compass is the radius of the circle.



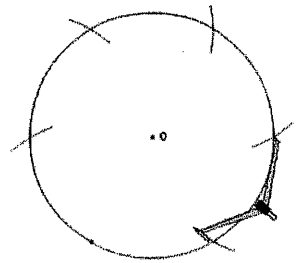
3. Make an arc across the circle.



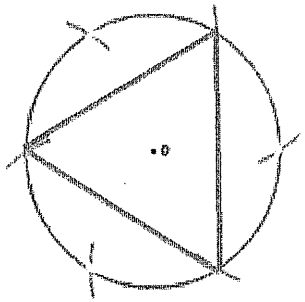
4. Move the compass on the next vertex and draw another arc. This is the second vertex of the equilateral triangle.



5. Continue this way until you have six arcs.



6. Draw a line between every other arc, for a total of three lines.



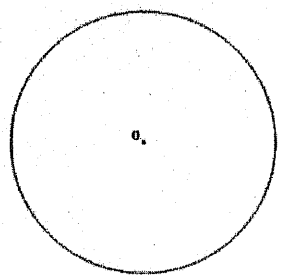
Done!

You have constructed an equilateral triangle!

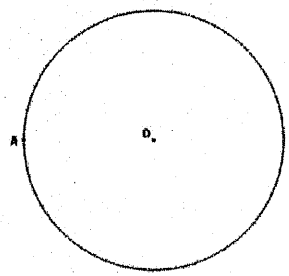
Square Inscribed in a Circle

http://www.mathopenref.com/constinsquare.html

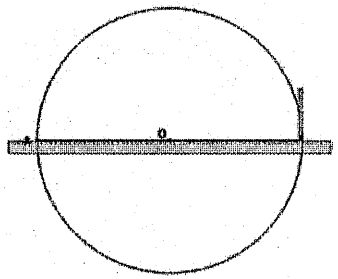
Start:
Given a circle with center O, construct a square inscribed in the circle.



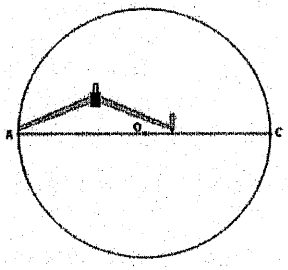
1. Mark a point A on the circle. This will become one of the vertices of the square.



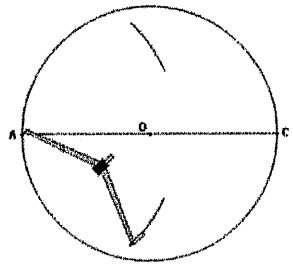
2. Draw a diameter line from the point A, through the center and on to cross the circle, again, creating point C.



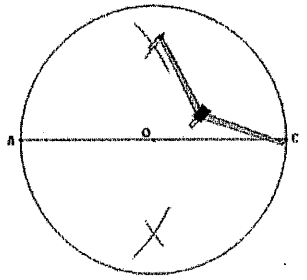
3. Set the compass on A and set the width to a little more than the distance to O.



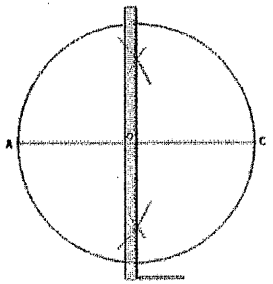
4. Draw an arc above and below O.



5. Move the compass to C and repeat.

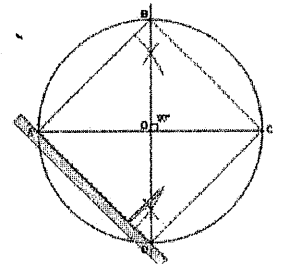


6. Draw a line through where the arc pairs cross, making it long enough to touch the circle at the top and bottom, creating the new points B and D.



7. Draw a line between each successive pairs of points A, B, C, D.

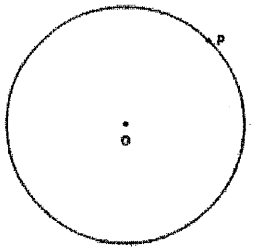
ABCD is a square.



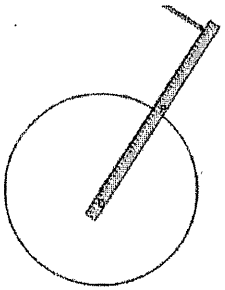
Tangent at a Point on a Circle

http://www.mathopenref.com/consttangent.html

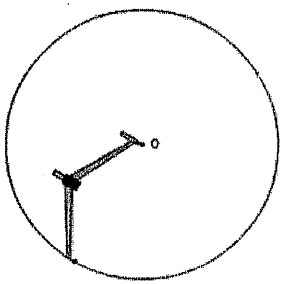
Start:
Given a circle with center O and point P somewhere on the given circle, construct a tangent at the point on the circle.



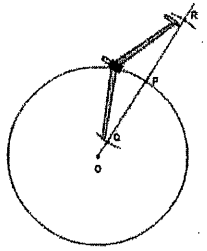
1. Draw a straight line from the center O, through the given point P and on beyond P.



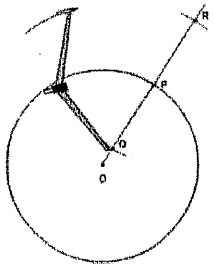
2. Put the compass's point on P and set it to any width less than the distance OP. Then, on the line just drawn, draw an arc on each side of P. This creates the points Q and R as shown.



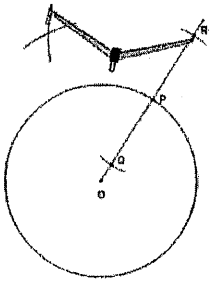
3. Set the compass on Q and set it to any width greater than the distance QP.



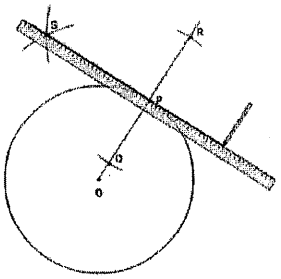
4. *Without changing the compass's width,* draw an arc approximately in the position show on one side of P.



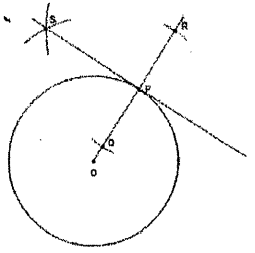
5. *Without changing the compass's width,* move the compass to R and Make another arc across the first, creating point S.



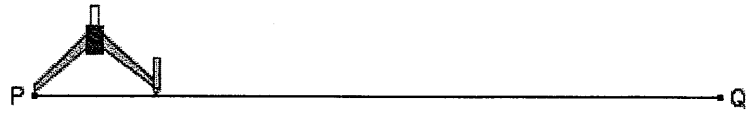
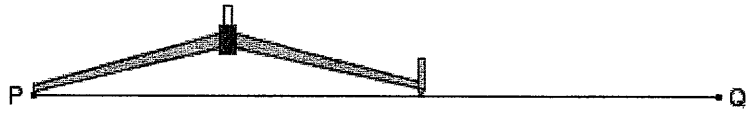
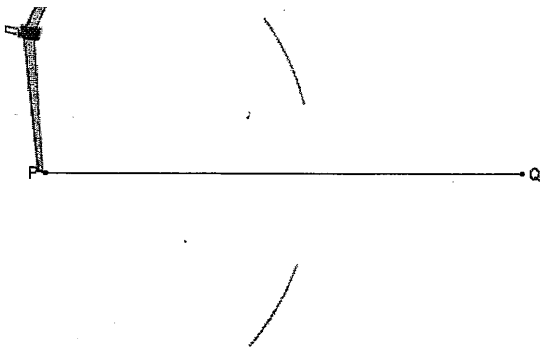
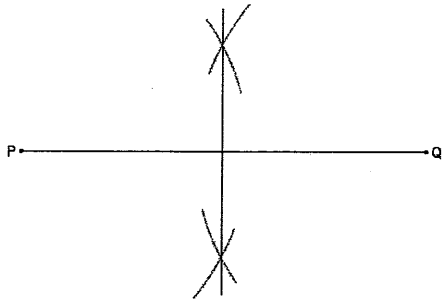
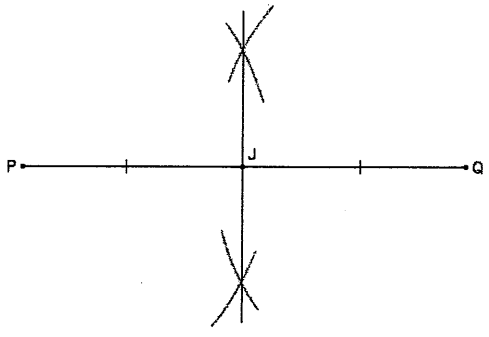
6. Draw a line through P and S.



7. Done. The line PS just drawn is the tangent to the circle O through point P.



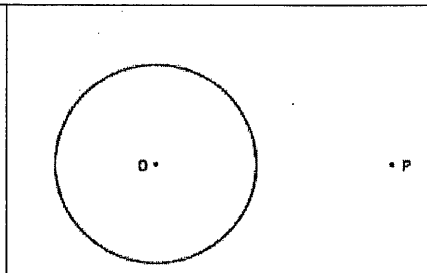
Perpendicular Bisector of a Line Segment

http://www.mathopenref.com/constbisectline.html	
Start: Given a line segment PQ, construct its perpendicular bisector.	
2. Set the compass's width to approximately two thirds the line length. The actual width does not matter.	
3. *Without changing the compass's width,* draw an arc above and below the line.	
4. Again, *without changing the compass's width,* place the compass's point on the other end of the line. Draw an arc above and below the line so that the arcs cross the first two.	
5. Using a straightedge, draw a line between the points where the arcs intersect.	
Done! This line is perpendicular to the first line and bisects it (cuts it at the exact midpoint of the line).	

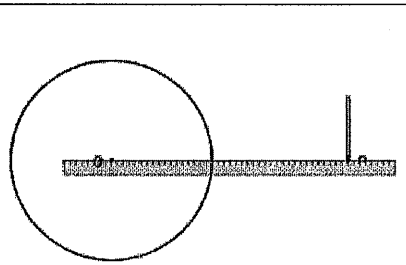
Tangent to a Circle from an External Point

http://www.mathopenref.com/consttangents.html

Start:
Given a circle with center O and point P outside the given circle, construct a tangent to the circle from point P.

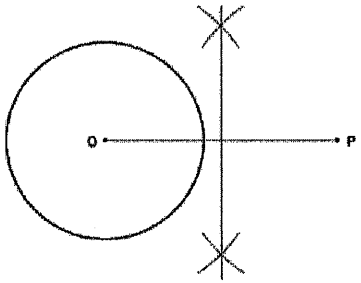


1. Draw a straight line between the center O of the given circle and the given point P.

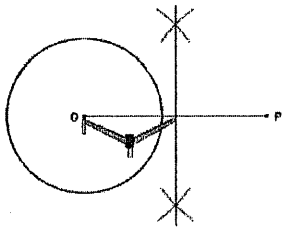


2. Find the midpoint of this line by constructing the line's perpendicular bisector.

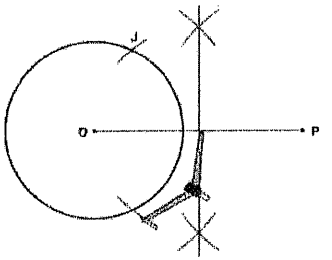
Refer to construction before to construct a perpendicular bisector



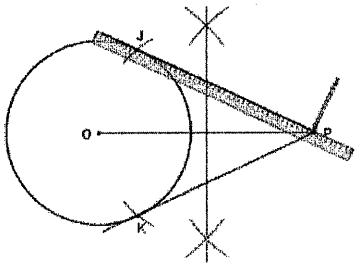
3. Place the compass on the midpoint just constructed, and set its width to the center O of the circle.



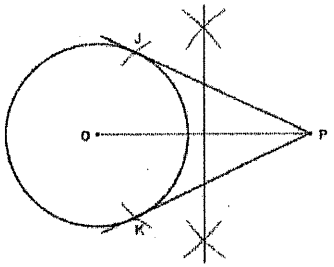
4. *Without changing the compass's width,* draw an arc across the circle in the two possible places the tangent could touch. These are the contact points J, K, for the tangents.



5. Draw the two tangent lines from P through J and K.



6. The two lines just drawn are tangential to the given circle and pass through P.



Done!

You have constructed a tangent to the circle from a point outside the circle!