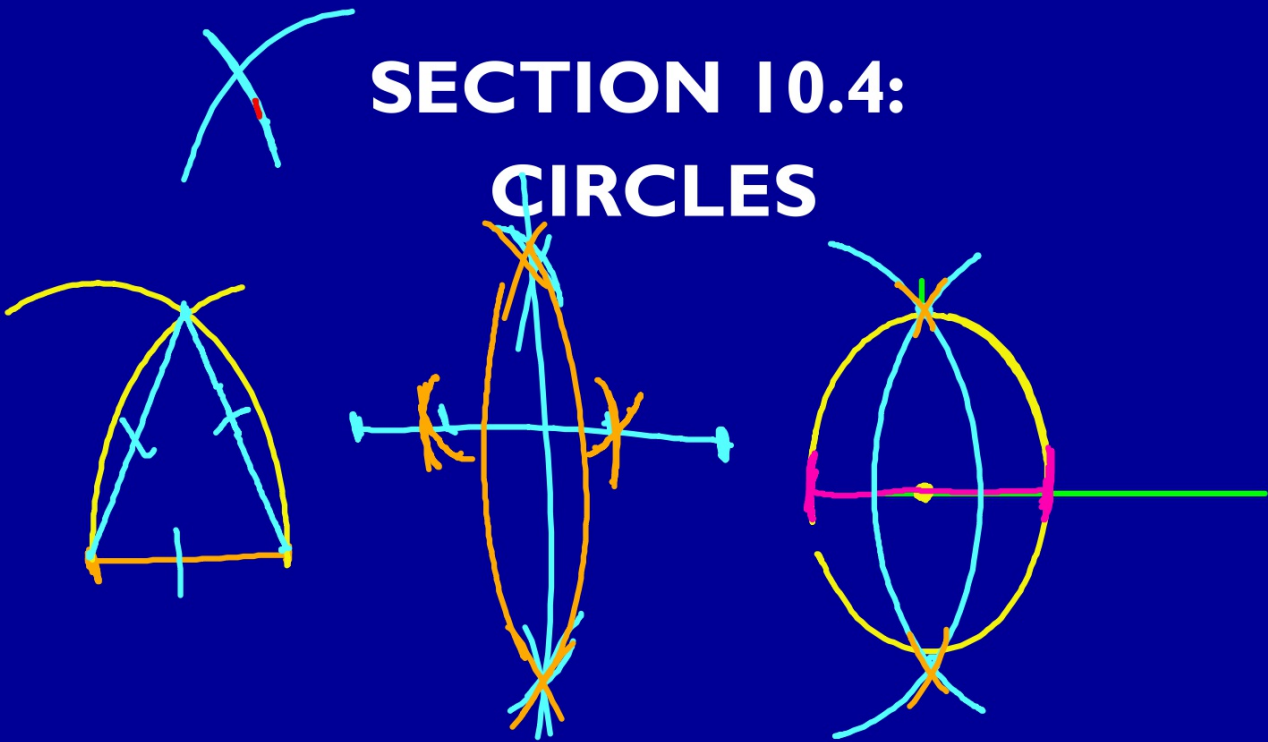


# SECTION 10.4: CIRCLES

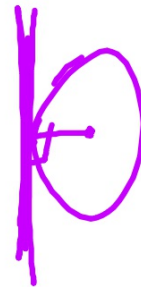
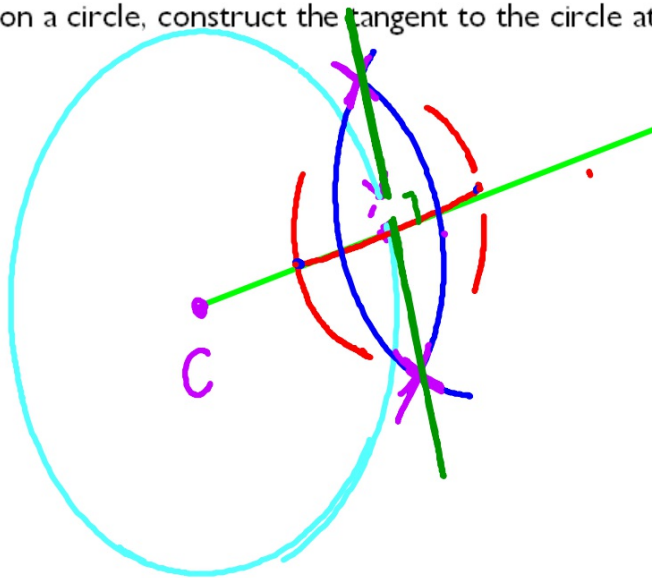


### THEOREM

The lines that contain the altitudes of a triangle intersect in a point.

### CONSTRUCTION 8

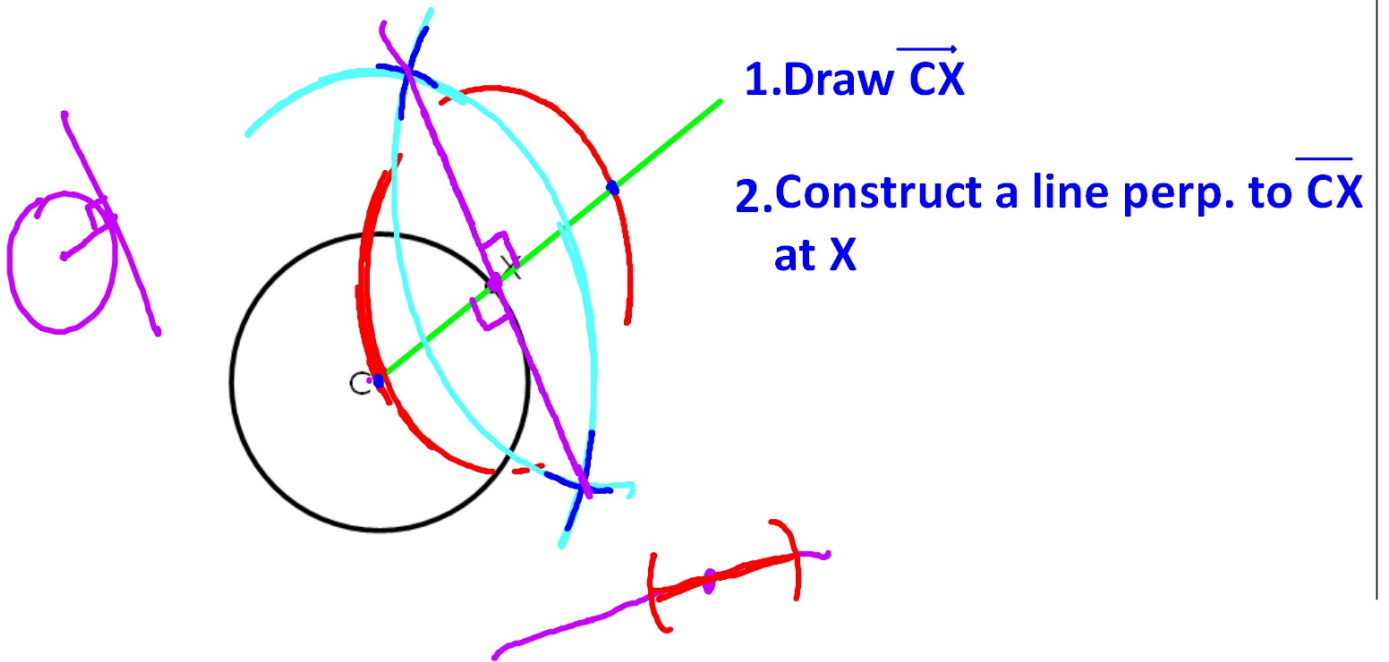
Given a point on a circle, construct the tangent to the circle at the given point.



1. Draw  $\vec{CX}$
2. Construct a  $\perp$  line to  $\vec{CX}$  at point X  
LABEL

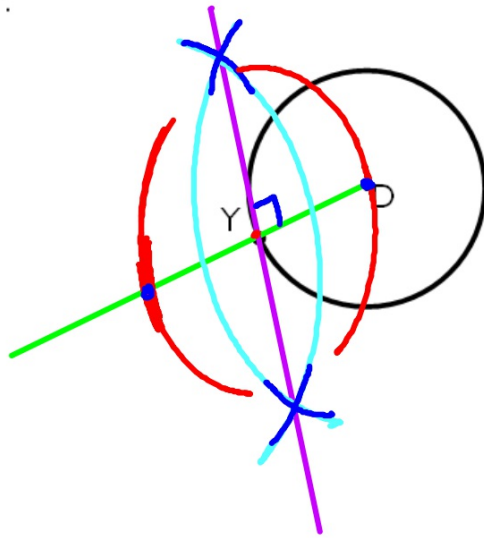
**EXAMPLE I**

Construct the tangent to circle C at X.



**YOUR TURN**

Construct the tangent to circle D at Y.

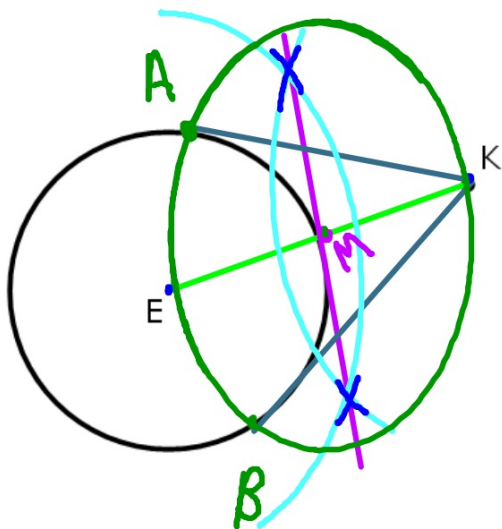
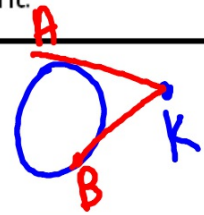
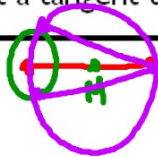


### CONSTRUCTION 9

Given a point outside a circle, construct a tangent to the circle from the given point.

### EXAMPLE 2

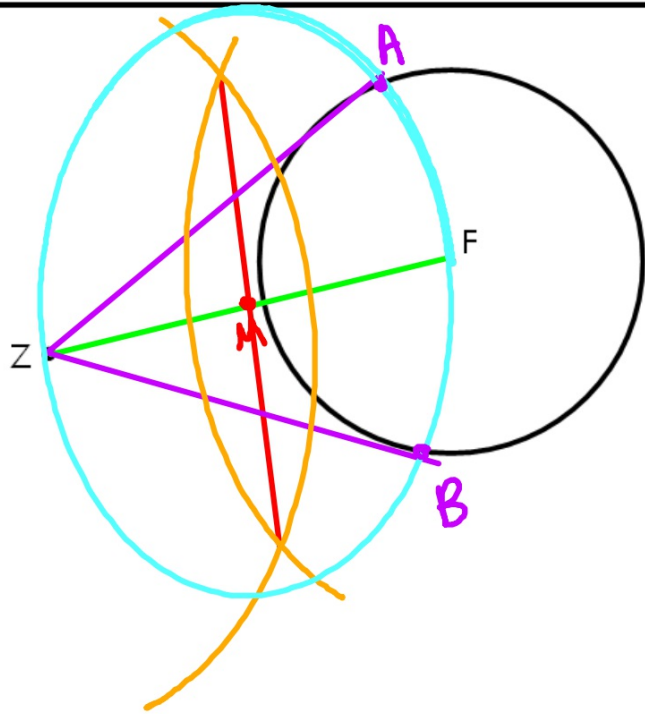
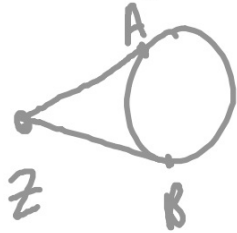
Construct a tangent to circle E from K



1. Draw  $\overline{EK}$
2. Find midpt of  $\overline{EK}$  (M)  
perp. bisector
3. Draw circle M with  
radius EM
4.  $\overrightarrow{KA}$  and  $\overrightarrow{KB}$  are tangents

**YOUR TURN**

Construct a tangent to circle F from Z



## THEOREM

The perpendicular bisectors of the sides of a triangle intersect in a point that is equidistant from the three vertices.

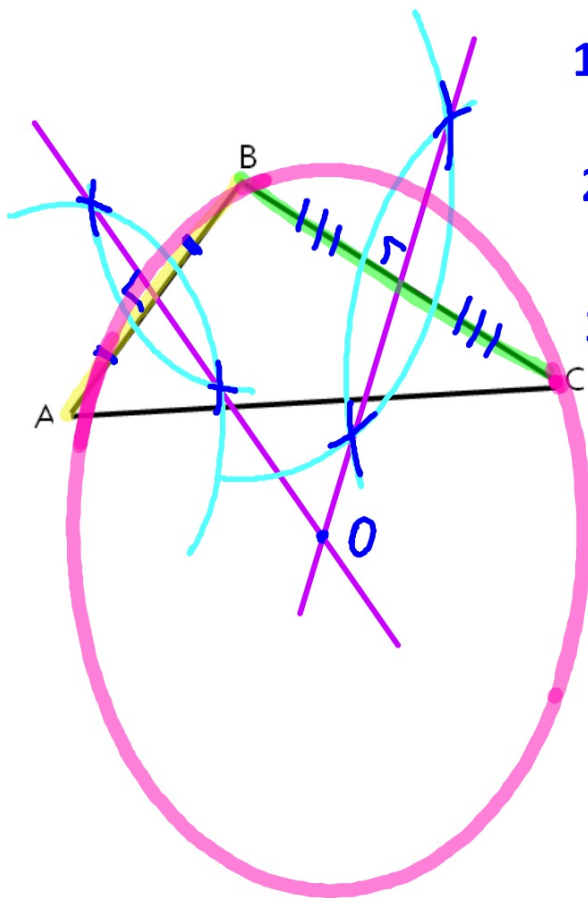
## CONSTRUCTION 10

Given a triangle, circumscribe a circle about the triangle.



### EXAMPLE 3

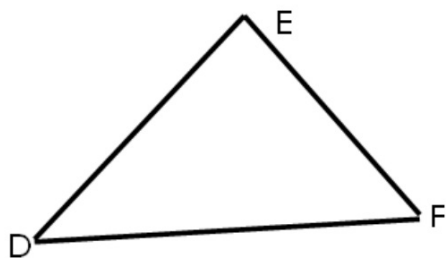
Construct a circle passing through A, B, and C (circumscribe a circle about  $\triangle ABC$  / inscribe  $\triangle ABC$  in a circle).



1. Construct the perp. bisectors of any 2 sides.
2. Pt of intersection = O
3. Draw circle O with radius OA/OB/OC

**YOUR TURN**

Construct a circle passing through D, E, and F.

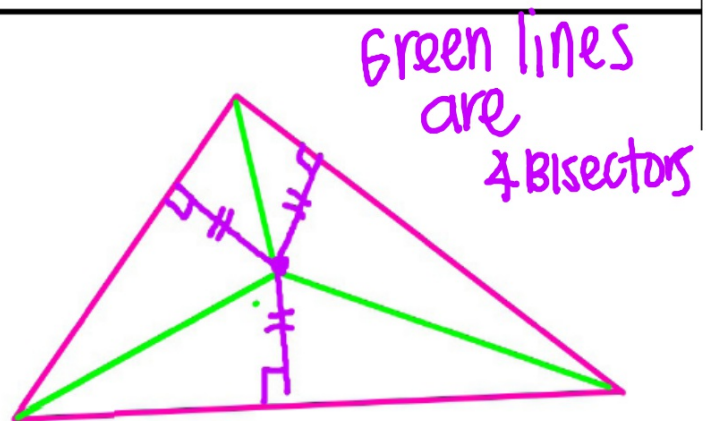


## THEOREM

The bisectors of the angles of a triangle intersect in a point that is equidistant from the three sides of the triangle.

## CONSTRUCTION II

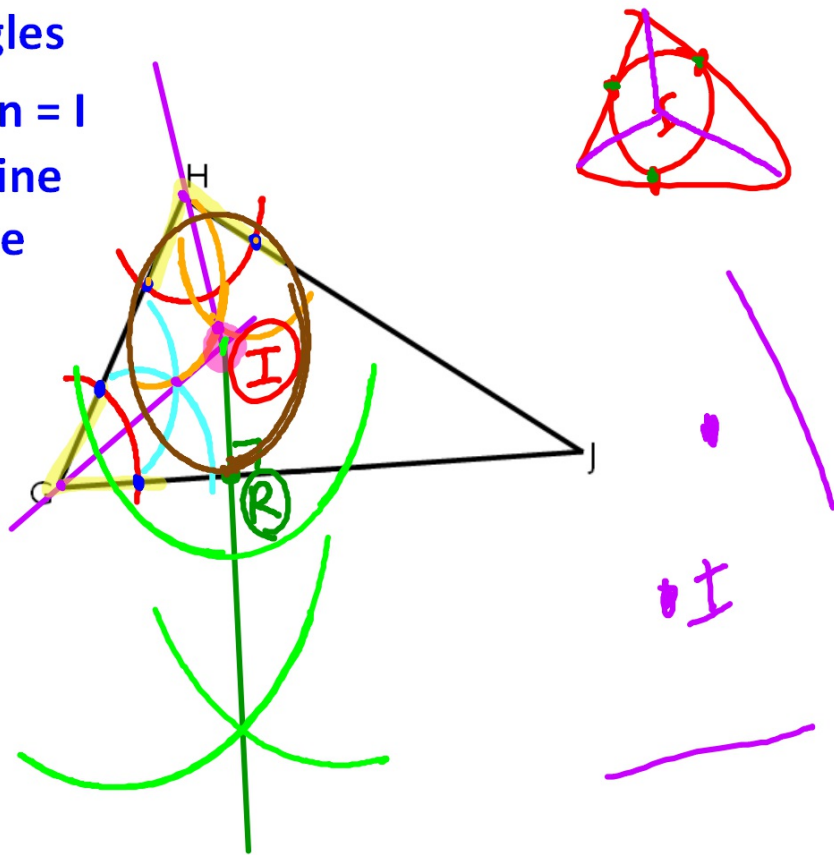
Given a triangle, inscribe a circle in the triangle



#### EXAMPLE 4

Construct a circle tangent to  $\overline{GH}$ ,  $\overline{HJ}$ , and  $\overline{GJ}$  (inscribe a circle in  $\triangle GHJ$ ).

1. Bisect any 2 angles
2. Pt of intersection = I
3. Construct perp line from I to any side
4. Draw circle I with radius RI



**YOUR TURN**

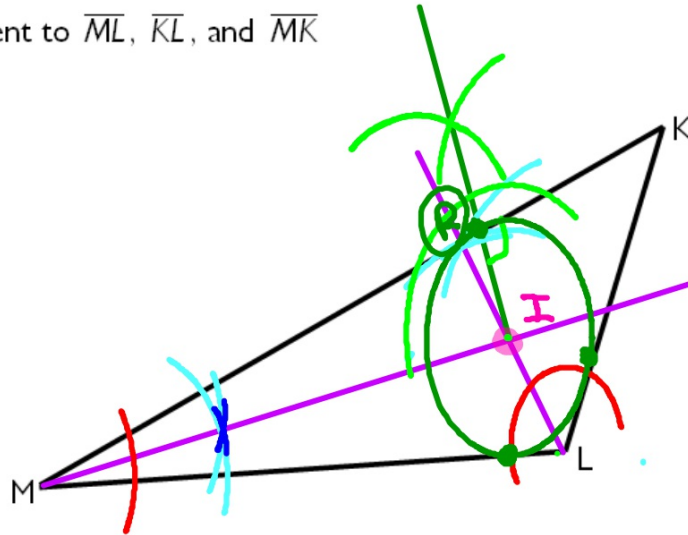
Construct a circle tangent to  $\overline{ML}$ ,  $\overline{KL}$ , and  $\overline{MK}$

① Bisect  $\angle$

② Name  $I$

③  $\perp$  from  $I$   
to side

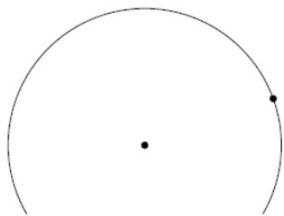
④ circle  
center  $I$   
radius  
 $R_I$



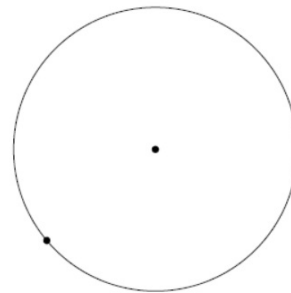
# **HOMEWORK**

**Construct a line segment tangent to the circle through the point given.**

1)

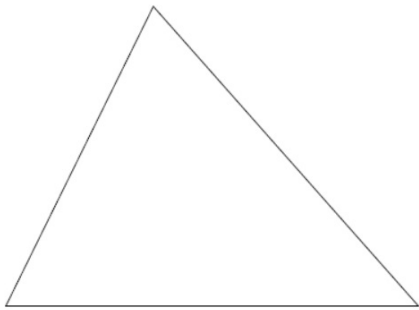


2)

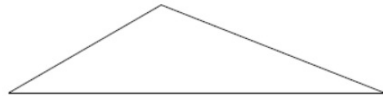


**Circumscribe a circle about each triangle.**

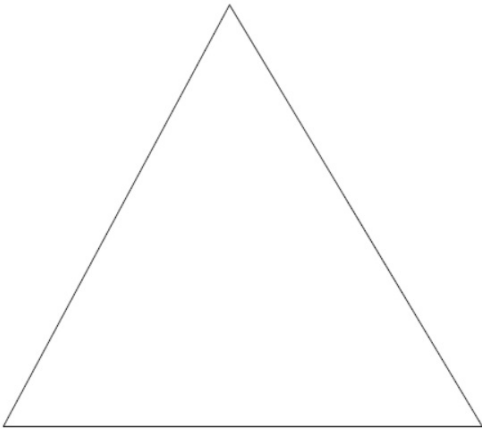
5)



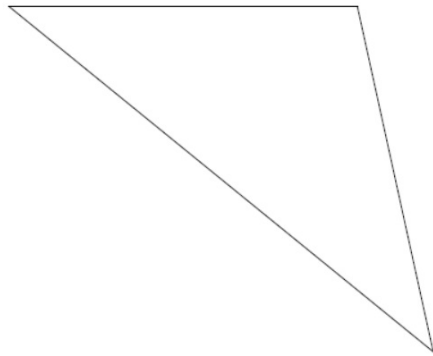
6)



11)

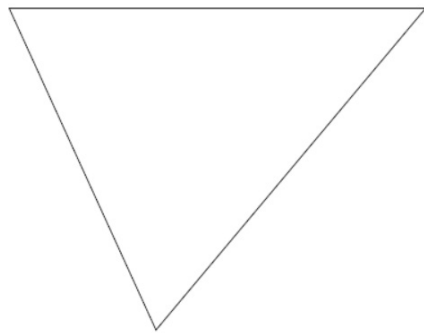


12)

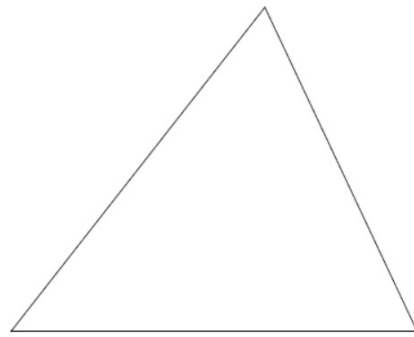


**For each triangle, construct all three medians to show they are concurrent.**

13)

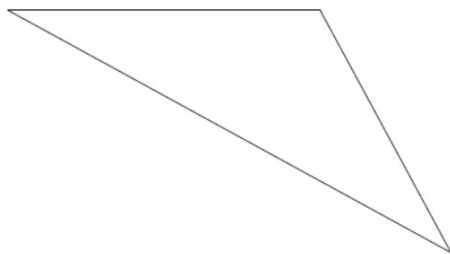


14)

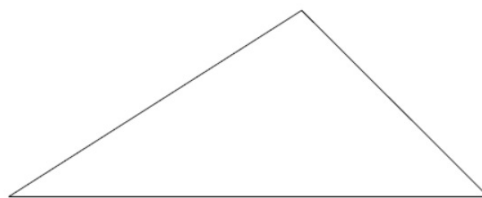


**For each triangle, construct all three perpendicular bisectors to show they are concurrent.**

15)

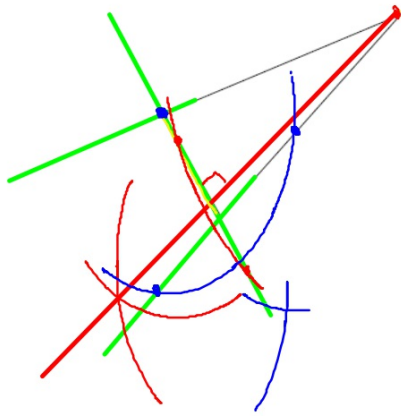


16)



For each triangle, construct all three altitudes to show they are concurrent.

17)



18)

