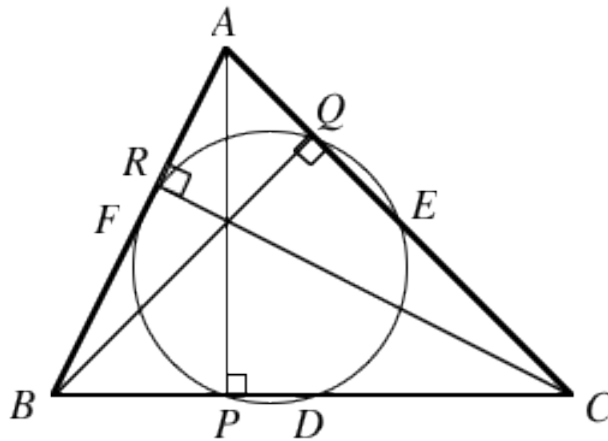


Mathematics 2260H – Geometry I: Euclidean geometry  
TRENT UNIVERSITY, Winter 2012

Assignment #9  
The six-point circle

Due on Thursday, 22 March, 2012.

1. Suppose  $D$ ,  $E$ , and  $F$  are midpoints of sides  $BC$ ,  $AC$ , and  $AB$  of  $\triangle ABC$ , respectively. Also, suppose that  $P$ ,  $Q$ , and  $R$  are the points on  $BC$ ,  $AC$ , and  $AB$ , respectively, where the altitudes from  $A$ ,  $B$ , and  $C$  meet those sides. Show that the six points  $D$ ,  $E$ ,  $F$ ,  $P$ ,  $Q$ , and  $R$  are all on the same circle. [10]



HINT: Start with the fact that this circle is the circumcircle of  $\triangle DEF$ , which is similar to and has sides parallel to those of  $\triangle ABC$ . This one is likely to be pretty tough to do on your own. Remember that you are allowed to look things up!

NOTE:  $P$ ,  $Q$ , and  $R$  are said to be the *feet* of the altitudes of  $\triangle ABC$ .