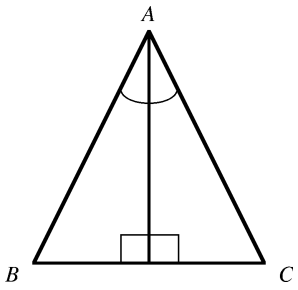
Mathematics 226H – Geometry I: Euclidean geometry
TRENT UNIVERSITY, Fall 2006

Quizzes

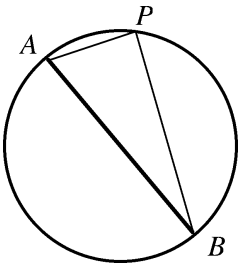
Quiz #1. 22 September, 2006 *[5 minutes]*

1. Suppose that the angle bisector of $\angle A$ in $\triangle ABC$ is also the altitude from vertex A. Show that $\triangle ABC$ is isosceles. *[5]*



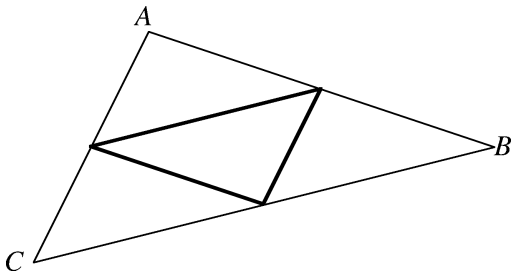
Quiz #2. 29 September, 2006 *[5 minutes]*

1. Suppose AB is a diameter of a circle and P is any other point on the circle. Show that $\angle APB = 90°$. *[5]*



Quiz #3. 6 October, 2006 *[5 minutes]*

1. Show that the triangle whose vertices are the midpoints of the sides of $\triangle ABC$ (*i.e.* the *medial* triangle) is similar to $\triangle ABC$. *[5]*



Quiz #4. 13 October, 2006 *[5 minutes]*

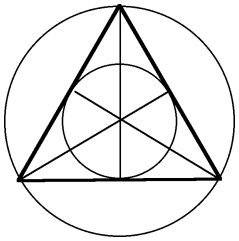
1. Give an example of triangles $\triangle ABC$ and $\triangle PQR$ which have the same circumcentre and the same centroid, but are *not* congruent. *[5]*

Quiz #5. 20 October, 2006 *[5 minutes]*

1. Suppose $\triangle ABC$ is *not* a right triangle and H is its orthocentre. Verify that C is the orthocentre of $\triangle ABH$. *[5]*

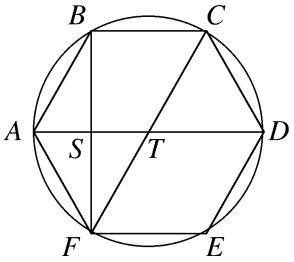
Quiz #6. 3 November, 2006 *[5 minutes]*

1. The centroid of an equilateral triangle is also its incentre. What is the ratio of the circumradius of the triangle to the inradius? *[5]*



Quiz #7. 10 November, 2006 *[5 minutes]*

1. Suppose $ABCDEF$ is a regular hexagon inscribed in a circle, and S and T are the intersections of BF and CF, respectively, with AD. Compute $\mathbf{cr}(A, S, T, D)$. *[5]*

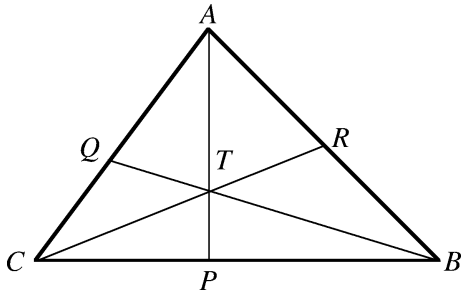


Hint: The following values of $\sin(\theta)$ may be of some use:

θ	$\sin(\theta)$
0°	0
30°	$\frac{1}{2}$
60°	$\frac{1}{2}\sqrt{3}$
90°	1

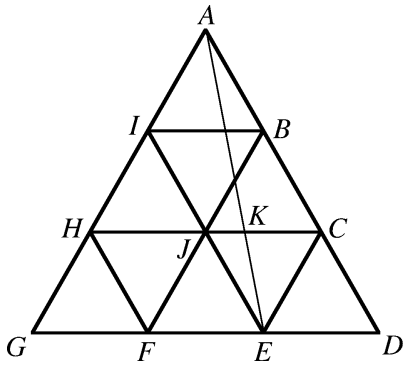
Quiz #8. 17 November, 2006 *[7 minutes]*

1. Suppose $\triangle ABC$ has $|AB| = 4\sqrt{2}$, $|AC| = 5$, and $|BC| = 7$. Assume that AP is the altitude from A and $|AP| = 4$, CR is the median from C, and Q is chosen on AC so that AP, BQ, and CR are concurrent. Determine $|QA|$. *[5]*



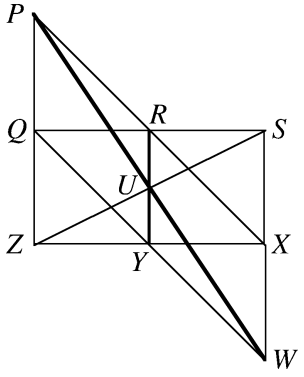
Quiz #9. 24 November, 2006 *[7 minutes]*

1. Suppose A–J are the vertices of nine equilateral triangles arranged to form a large equilateral triangle as in the diagram, and suppose K is the point on JC such that $|JK| = \frac{1}{3}|JC|$. Show that A, K, and E are collinear. *[5]*



Quiz #10. 1 December, 2006 *[7 minutes]*

1. Suppose P–S and W–Z are the vertices of several adjacent congruent isosceles right-triangles as in the diagram, and suppose U is the point of intersection of SZ with RY. Show that P, U, and W are collinear. *[5]*



Quiz #11. 7 December, 2006 *[5 minutes]*

1. Given a circle, find a ruler and compass construction which locates the centre of the circle. *[5]*