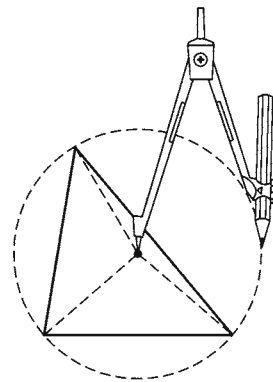


Assignment 5

1. Draw a large triangle on a patty paper. Fold the perpendicular bisector of each of the three sides of the triangle. If you have folded them correctly, they will be concurrent (intersect in a single point). The point of concurrency is the **circumcenter** of the triangle. Measure and compare the distances from the circumcenter to each of the three vertices of the triangle. They should be the same.

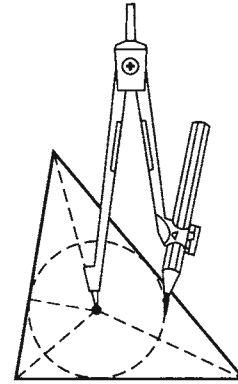
Use your compass to construct a circle that passes through the three vertices of the triangle with the circumcenter as the center of the circle. To construct the circle you will need its radius, the distance from the circumcenter to any vertex. The circle is said to be **circumscribed** about the triangle.

Tape the patty paper below.



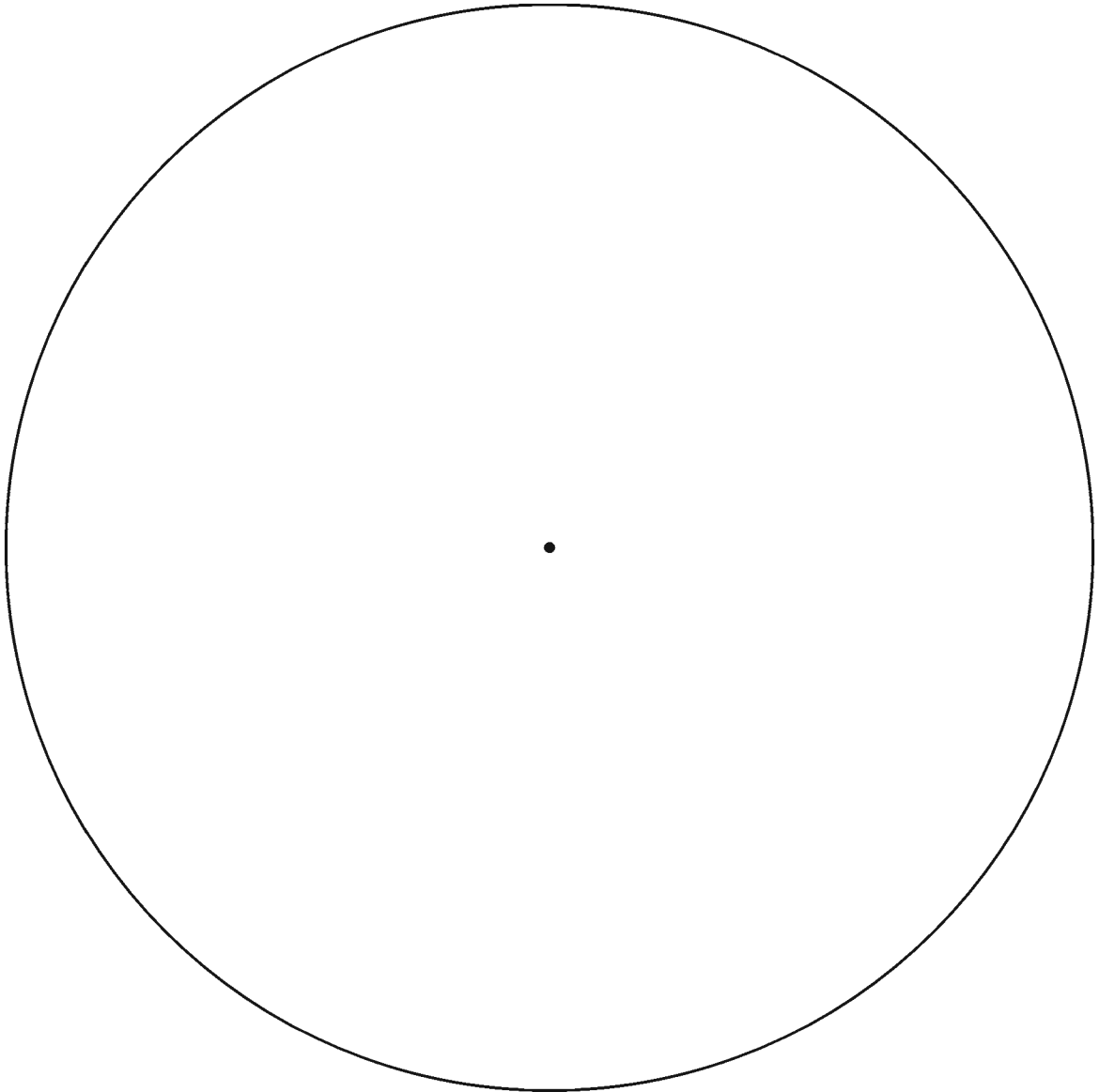
2. Draw a large triangle on a patty paper. Fold the bisector of each of the three angles of the triangle. If you have folded them correctly, they will be concurrent (intersect in a single point). The point of concurrency is the **incenter** of the triangle. Measure and compare the (perpendicular) distances from the incenter to each of the three sides of the triangle. They should be the same.

You can use your compass to construct a circle that is tangent to the three sides of the triangle (touch each side of the triangle at exactly one point) with the incenter as the center of the circle. To construct the circle you will need its radius, the shortest (perpendicular) distance from the incenter to each side. To get the radius, fold a perpendicular from the incenter to one of the sides of the triangle. Draw the circle on the patty paper. The circle is said to be **inscribed** in the triangle.

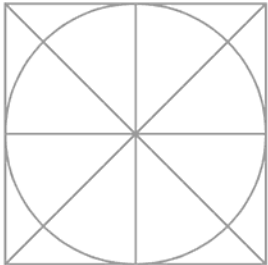
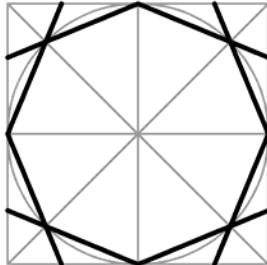
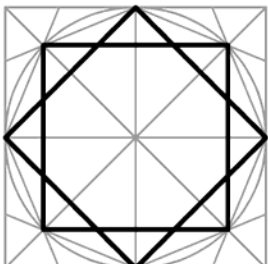
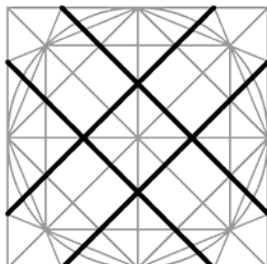
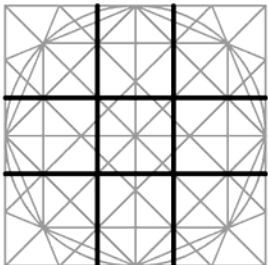
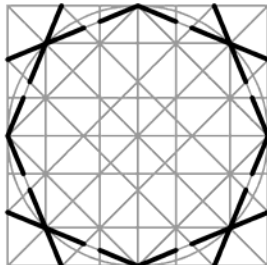
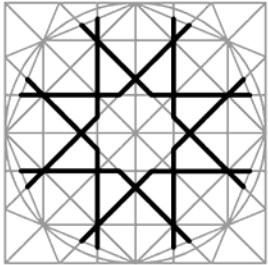
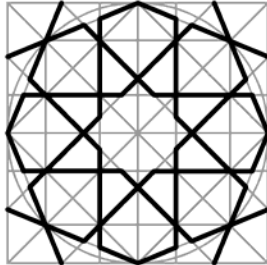


Tape the patty paper below.

3. Use a compass and straightedge to construct an inscribed regular pentagon in the circle below. Show all construction lines and arcs.

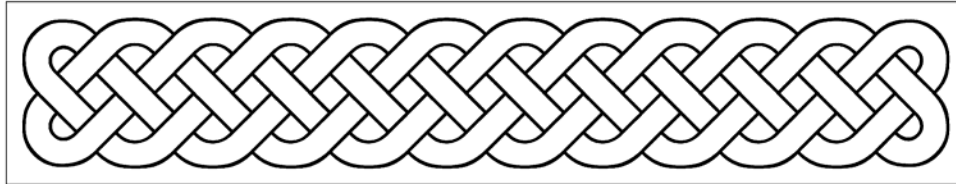


4. Here is another classic Islamic tile construction. Reproduce the basic tile in each of the four squares of the grid on the following page. Use faint pencil lines for the first 5 steps, then erase all of these pencil lines when you are done.

<p>Step 1</p> <p>Draw a circle plus diagonal, vertical and horizontal lines in the parent square.</p>		<p>Step 2</p> <p>Draw eight line segments each of which starts where a horizontal or vertical line meets the circle & square and extends through the intersection of the diagonal line with the circle.</p>	
<p>Step 3</p> <p>Draw two squares within the circle.</p>		<p>Step 4</p> <p>Draw two pairs of diagonal parallel line segments that extend through the intersections of these two squares.</p>	
<p>Step 5</p> <p>Draw two pairs of horizontal and vertical parallel line segments that extend through the same intersection points.</p>		<p>Step 6</p> <p>All the necessary construction lines have now been drawn in pencil. With a colored pen, draw the line segments shown in the diagram.</p>	
<p>Step 7</p> <p>With the same colored pen as in Step 6, draw the remaining line segments shown in the diagram.</p>		<p>Step 8</p> <p>The figure shows the result. The pencil lines from the first 5 steps should be erased.</p>	

5. A fun project for elementary students is to make a Celtic Knot bookmark. On-line directions will be found by googling “collections canada celtic bookmark” or at <http://www.collectionscanada.gc.ca/settlement/kids/021013-1804-e.html>

Unfortunately the graphic file provided in the web page is unsuitable for a variety of reasons ... so I made my own. The actual graphic is 7.25 inches long.



You can access 300 dpi (high res) or 180 dpi (low res) bitmap versions of the graphic (BOOKMARK (7.25).bmp or #BOOKMARK (7.25).bmp) on the Math Fun CD or on drive S of any Ewing lab computer as usual. Open the selected file with *Windows 7 Paint* or *Ultimate Paint*, then color the knot. Color the hairline border the same color as the background. Print in color (*Windows 7 Paint*: adjust the print setup to 100% normal size / *Ultimate Paint*: set the width to 7.25 inches). Glue the printout to cardstock, laminate the bookmark area, then trim. Tape your bookmark below.

6. My bookmark was created with Microsoft Word and the Celtic outline font CELTK.TTF from <http://www.clanbadge.com/knots.htm>. The font is on all Ewing Lab computers. An instruction manual is on drive S and on the Math Fun CD in the directory Celtic Knot Fonts (which includes the font for home installation) or you can download the source file from http://britton.disted.camosun.bc.ca/knots_O.zip. Create an original Celtic knot design using the Celtic outline font, provide the source text, then print the result.

OR

You will find terrific Mandala software on all GP lab computers.

Path: Start → Programs → Math & Statistics → Jill's Math Fun → MandalaMaker

The software is also on the Math Fun CD in the directory Mandala Maker which includes a detailed tutorial. You can reproduce the mandala in the tutorial, using your own colors to individualize it, or design your own. When done, export your mandala as a jpg file, then print in color with *Windows 7 Paint* or *Ultimate Paint*.

OR

Create an original Mandala with compass and straightedge, then color your result.

ATTACH THE RESULT FROM THE CHOSEN ACTIVITY TO THIS ASSIGNMENT.