Problem-solving using geometric construction

- Use pencil, compass and straight-edge only to complete these tasks (no protractors).
- You should not be using your straight-edge to measure anything or to create right angles.
- All of these can be made using the basic constructions in the handout.
- Leave your construction arcs and lines in place so that we can follow your logic!

1a) Construct an **obtuse isosceles triangle** with the given line as the non-equal leg:

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b) Construct an **acute isosceles triangle** with the given line as the non-equal leg:

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1c) Construct an isosceles triangle with the given line as one of the equal legs:

2. Find the midpoint of each side of the triangle. Draw a line from each midpoint to the vertex opposite.

You’ve just constructed the medians of the triangle. The point where the medians meet is called the centroid of the triangle – if we were to cut the triangle out of stiff paper or cardboard and hang it from a thread through the centroid, the triangle would lie flat. This is the centre of gravity of the triangle.
3. Construct a **square** whose corners just touch the inside of the circle. Then turn your square into an **octagon**.

4a) Construct a **(non-square) rhombus** with the given line as one side.
4b) Construct a square with the given line as one side.

5.

Use the above angles (and no protractor!) to construct:
(a) angle $3b$
(b) angle $(a + b)/2$
6. Construct:
(a) a $30^\circ$ angle 
   \textit{(Remember: no protractor!)}

(b) a $45^\circ$ angle

(c) a $75^\circ$ angle
7a) Construct a **hexagon** with this line as the side length.

(b) Inscribe a **hexagon** in the circle.

Three very good on-line sources of demonstrations, printable instructions, & worksheets:
- [mathopenref.com](http://mathopenref.com)
- [mathsisfun.com/geometry/constructions.html](http://mathsisfun.com/geometry/constructions.html)
- [whistleralley.com/construction/reference.htm](http://whistleralley.com/construction/reference.htm)