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!*

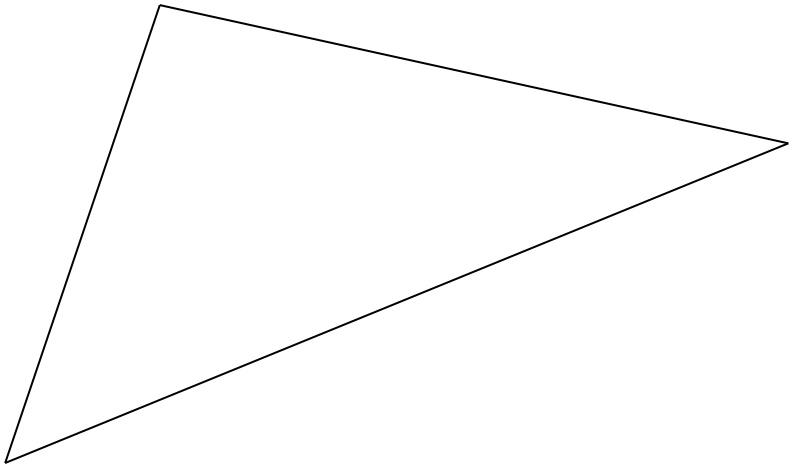
1a) Construct an **obtuse isosceles triangle** with the given line as the *non-equal leg*:

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

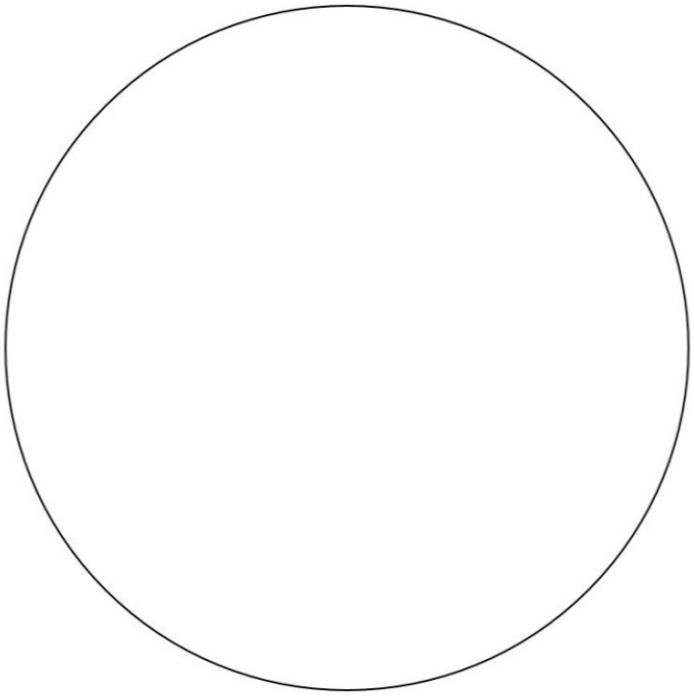
1c) Construct an **isosceles triangle** with the given line as one of the *equal legs*:

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

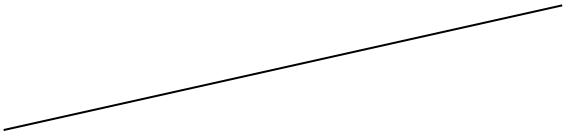
You've just constructed the *medians* of the triangle. The point where the medians meet is called the *centroid* of the triangle – if we were to cut the triangle out of stiff paper or cardboard and hang it from a thread through the centroid, the triangle would lie flat. This is the centre of gravity of the triangle.



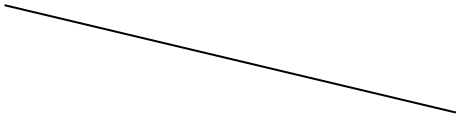
3. Construct a **square** whose corners just touch the inside of the circle.
Then turn your square into an **octagon.**



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

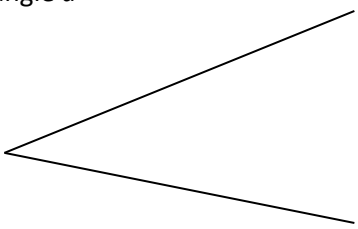


4b) Construct a **square** with the given line as one side.

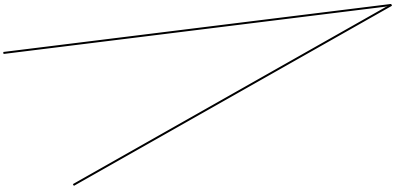


5.

angle *a*



angle *b*



Use the above angles (and **no** protractor!) to construct:

(a) **angle** $3b$

(b) **angle** $(a+b)/2$

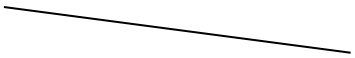
6. Construct:

(a) a $30°$ angle *(Remember: no protractor!)*

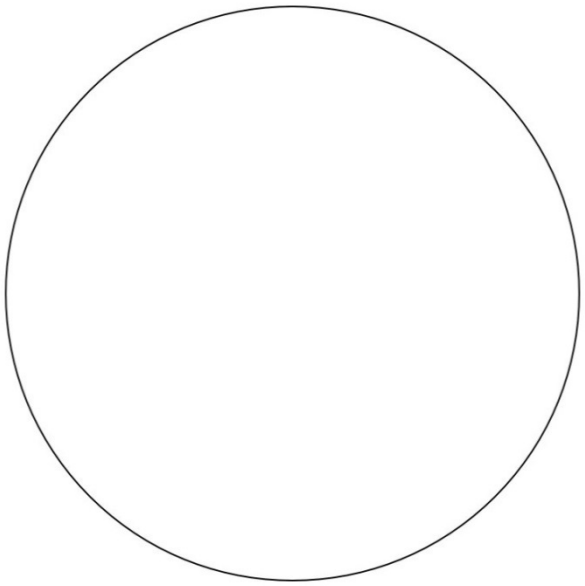
(b) a $45°$ angle

(c) a $75°$ 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
mathsisfun.com/geometry/constructions.html
whistleralley.com/construction/reference.htm