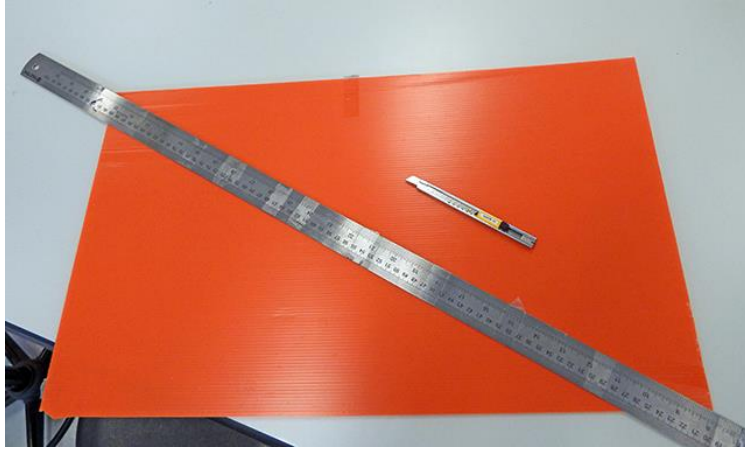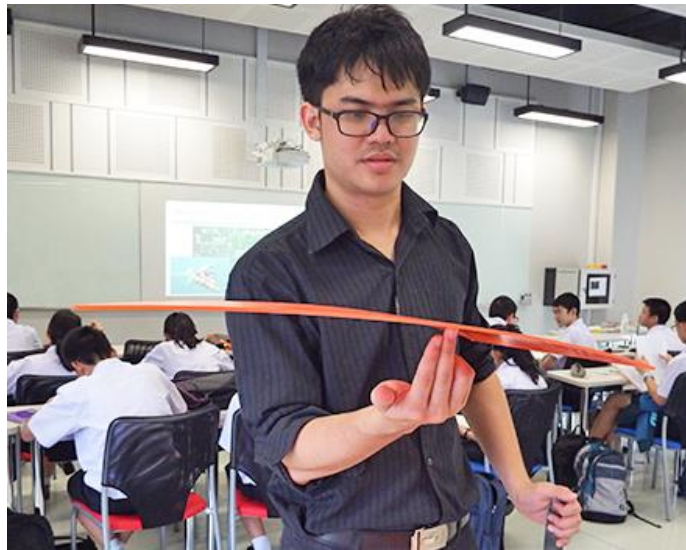## Triangle Demonstration 1: centre of mass

1 Cut a right-angled triangle.

**2** Find the centre of mass by hanging from corners or balancing on a finger.

3 Draw lines from points through the centre of mass with a white-board marker.

Show by measuring on the sides that the lines are **medians** and by measuring that the medians are divided in the ratio 2:1. Tell them the Math dept. can *prove* that for them sometime (if not done already).

The coordinate method

Write down the coordinates of the corners of your triangle as (1,1), (4,1) and (4,7). (Do some sketching to show that on A3 paper).
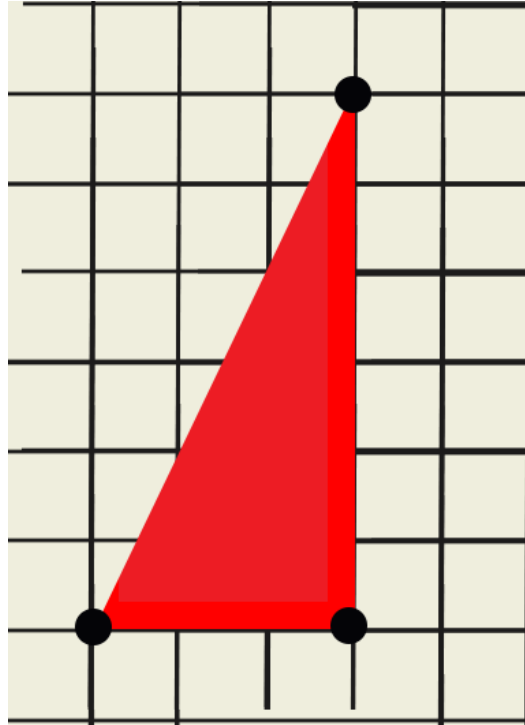
Write down the coordinates of the c.m. as [(1+4+ 4)/3, (1+1+7)/3)].
Ask the class to think about that.

Integration

If students are ready you could find the centre of mass with single and/or double integration. If they are not ready leave it alone. This is a physics class.

Questions

1 Explain *simply* in physical terms, why any horizontal triangle is in (unstable) equilibrium if supported on a line along a median.

2 Find the centre of mass of a uniform 5-12-13 triangle.

3* *Prove* that the coordinate method gives the correct c.m. for *any* triangle?

Hint: *a pleasing solution might have one diagram and two lines of working.*