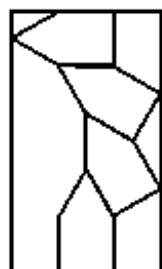




22. A pentagon is made by attaching an equilateral triangle to a square with the same edge length. Four such pentagons are placed inside a rectangle, as shown.

What is the ratio of the length of the rectangle to its width?

- A  $\sqrt{3}:1$     B 2:1    C  $\sqrt{2}:1$     D 3:2    E  $4:\sqrt{3}$



0892



©UKMT

22. A Let  $r$  be the length of a side of the equilateral triangle. Hence the width of the rectangle is  $r \sin 60^\circ + r + r \sin 60^\circ = r(1 + 2 \sin 60^\circ) = r(1 + \sqrt{3})$  and its length is  $3r + 2r \sin 60^\circ = r(3 + \sqrt{3})$ . So the ratio of the length to the width is

$$(3 + \sqrt{3}) : (1 + \sqrt{3}) = \sqrt{3}(1 + \sqrt{3}) : (1 + \sqrt{3}) = \sqrt{3} : 1.$$

