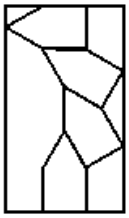
Question

Question ID: 892

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 $4:\sqrt{3}$



Answer

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

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