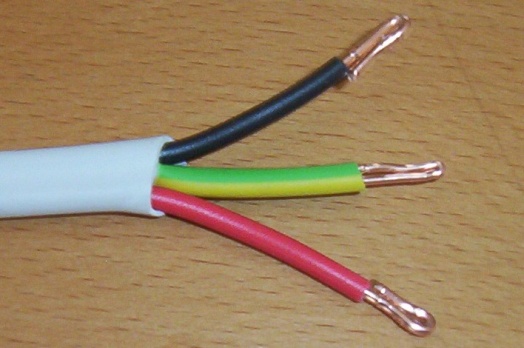
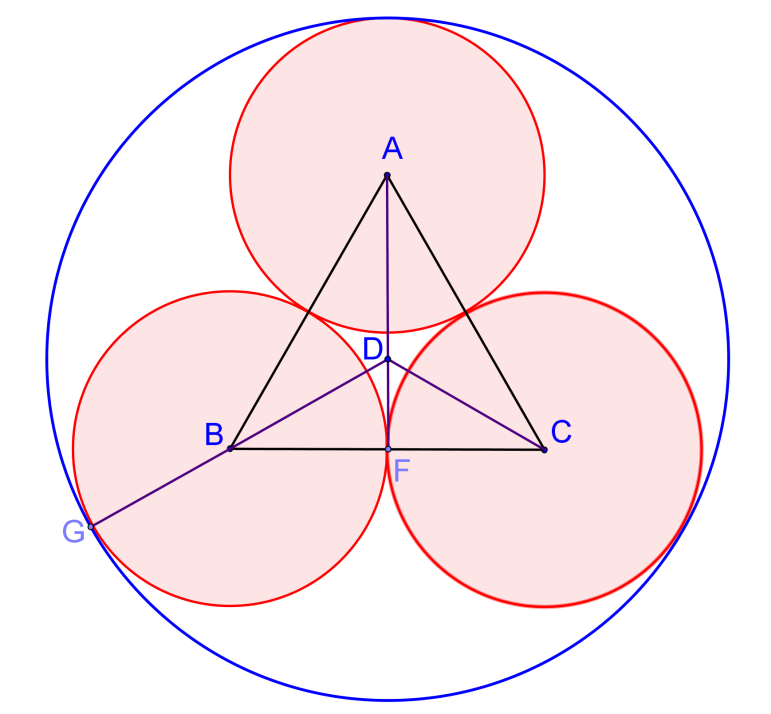
**Cable and wires**

Three wires of the same radius are wrapped with a plastic outer layer to form a blue cable.

The cross-section contains four circles shown below.

Find the **ratio** of the total area of the three wires (in red) to the area of empty space (in white) inside the large cable (in blue).

**Solution**

As in the diagram in the right, let be the centres of the small red circles.

Then is an equilateral.

Draw perpendicular to .

Let be the centre of the outer blue circle.

Draw and produce to meet the outer circle at .

For simplicity, let the radii of the three smaller circles be 1.

is a triangle.

Since ,

Area of three smaller red circles

Area of big blue circle

Area of empty space (in white) inside the blue cable

Therefore

**Yue Kwok Choy**

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