**Formal Proofs for Junior Cert Higher Level**

The following five theorems must be learned by heart. One of these may appear on the exam in June. You must learn them **exactly** as they appear here, including diagrams and constructions.

**1. Angles in triangle add to 180**



**2. The exterior angle of a triangle is equal to the sum of the interior opposite angles**



**3. In a parallelogram opposite sides and angles are equal in measure**

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**4. Pythagoras: In a right angled triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides**

Theorem: In a right-angled triangle, the square of the length of the side opposite to the right angle is equal to the sum of the squares of the other two sides.

**Given:** Right-angled triangle abc

**To Prove:** a2 + b2 = c2

**Construction:** Three right angled triangles as shown

**Proof:**  Area of large sq. = area of small sq. + 4(area D) (a + b)2 = c2 + 4(½ab)

 a2 + 2ab +b2 = c2 + 2ab

 a2 + b2 = c2

Note: To help with the construction you should draw a square of side 7cm. Mark off lengths of 3cm and 4cm on each side and let a = 3cm and b = 4cm. This will leave you with a square of side 5 ( = c) in the middle

**5. Angle at centre of circle is twice angle at circumference standing on same arc**

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