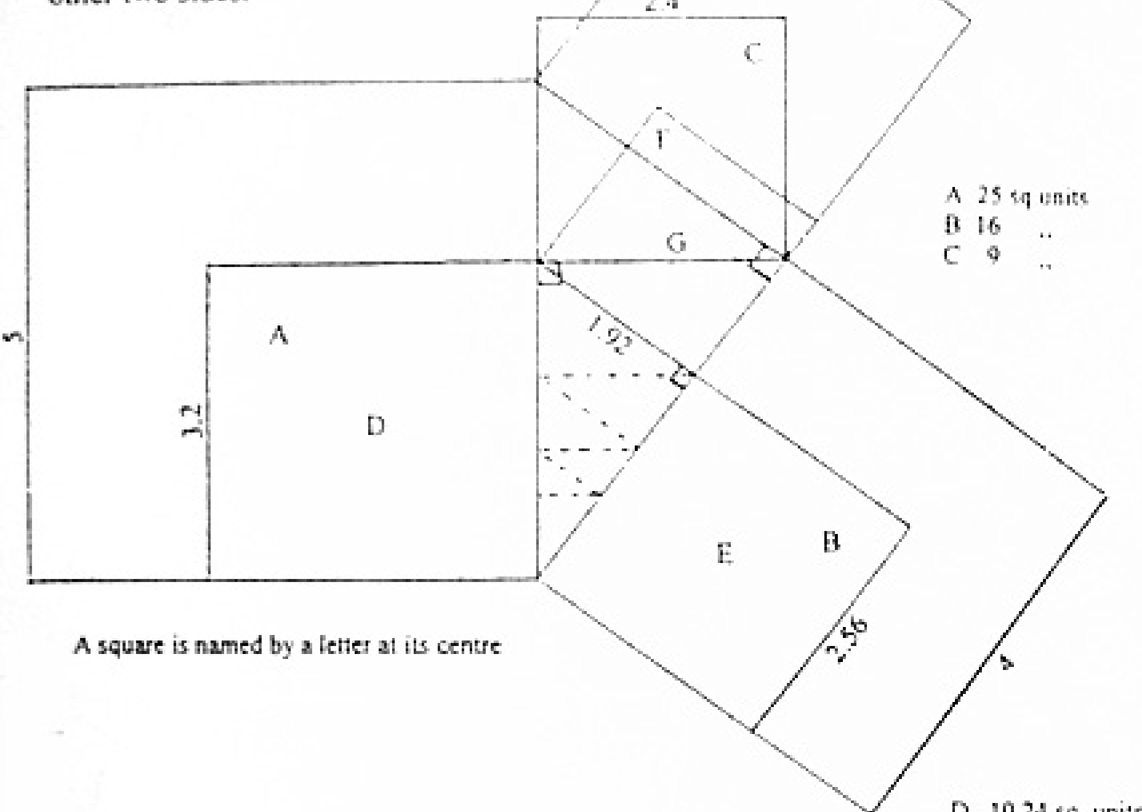
The Pythagorean theorem can be extended to apply to more than 3 squares (and by inference to circles and spheres)

Pythagorean theorem
In a right triangle the area of the square on its hypotenuse is equal to the combined area of the squares on its other two sides.



A square is named by a letter at its centre

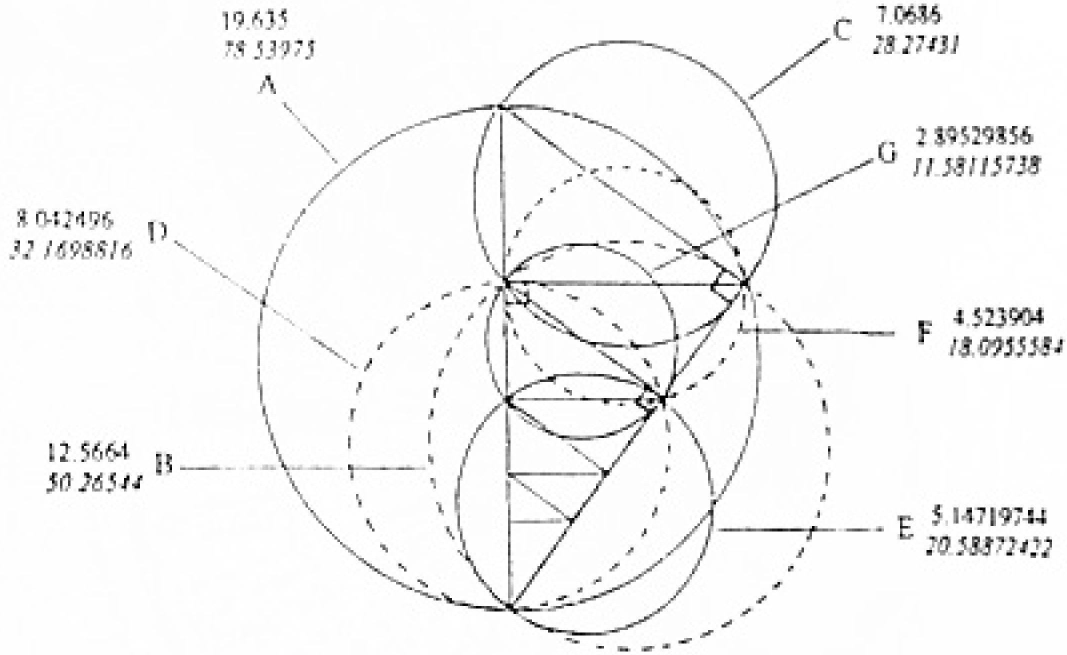
Application of the Pythagorean theorem

A (5^2) = B (4^2) + C (3^2)....(applying to 3 squares)

A (5^2) = D (3.2^2) + F (2.4^2) + C (3^2)....(applying to 4 squares)
where B is substituted for D and F

A (5^2) = E (2.56^2) + G (1.92^2) + F (2.4^2) + C (3^2)....(applying to 5 squares)
where D is substituted for E and G

Thus by substituting the square on the hypotenuse of the smaller right triangle the scope of the Pythagorean theorem can be extended repeatedly to include the areas of several related squares. Instead of squares, equilateral triangles or regular polygons or polyhedrons could be substituted, as shown in the diagrams overleaf.



areas (square units), for circles (in Roman script), for spheres (*in italics*)
values of diameters (refer to sides of squares in opposite page)

The right triangles in this diagram are congruent with those shown in the opposite page. Their sides (values given) form the diameters of circles which also represent spheres. In a similar manner as described for squares it can be proved that the Pythagorean theorem applies to circles and spheres also. By using the following

formulae (a) 0.7854 x diameter² (for area of a circle) and
(b) 3.14159 x diameter ²(for superficial area of a sphere) it can be proved

that A = B + C.... (applying to 3 circles / spheres)*
A = D + F + C.... (applying to 4 circles / spheres)
A = E + G + F + C....(applying to 5 circles / spheres)