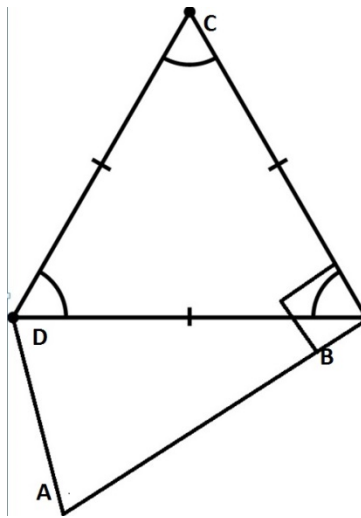


**Answer on Question #43331 – Math – Geometry**

A quadrilateral ABCD has an angle ABC=90 degree and contains equilateral triangle BCD with edge length 24 if AD=26. Find the area of ABCD

**Solution**



The area of ABCD is the sum of areas of triangle BCD and triangle ABD.

An area of triangle BCD is

$$S_{BCD} = \frac{24^2\sqrt{3}}{4} = 144\sqrt{3}.$$

$$\angle DBC = 60^\circ, \angle DBA = \angle ABC - \angle DBC = 90^\circ - 60^\circ = 30^\circ.$$

Sine rule:

$$\frac{AD}{\sin \angle DBA} = \frac{BD}{\sin \angle DAB} \rightarrow \sin \angle DAB = \frac{BD}{AD} \sin \angle DBA = \frac{24}{26} \sin 30^\circ = \frac{6}{13} \rightarrow \angle DAB = \sin^{-1} \frac{6}{13} = 27.5.$$

$$\angle ADB = 180^\circ - (\angle DAB + \angle DBA) = 180 - 30 - 27.5 = 122.5.$$

An area of triangle ABD is

$$S_{ABD} = \frac{1}{2} AD \cdot BD \sin \angle ADB = \frac{1}{2} \cdot 24 \cdot 26 \sin 122.5^\circ = 263.1.$$

The area of ABCD is

$$S_{ABCD} = S_{BCD} + S_{ABD} = 144\sqrt{3} + 263.1 = 512.5.$$

**Answer: 512.5.**