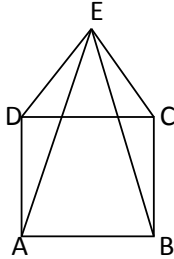


Answer on Question #39637 – Math – Geometry

ABCD is a square and triangle EDC is an equilateral triangle. Prove that $AE=BE$ and angle $DAE=15^\circ$

Solution:



As ABCD is a square, we have $\angle ADC = \angle BCD = 90^\circ$. As DEC is an equilateral triangle, then $\angle EDC = \angle ECD = 60^\circ$, and $\angle EDA = \angle EDC + \angle ADC = 150^\circ$, $\angle ECB = \angle ECD + \angle BCD = 150^\circ$.

In triangles ADE and BCE, $AD = BC$, $\angle EDA = \angle ECB$, As sides of equilateral triangle are equal, then $ED = EC$. Therefore $\triangle ADE = \triangle BCE$

Then $AE = BE$.

Since ABCD is a square, then $AB = BC = CD = AD$, (1)

since CDE is an equilateral triangle, then $CD = DE = EC$. (2)

From (1) and (2), we have

$AB = BC = AD = CD = DE = EC$. (3)

In triangle DAE, by (3)

$AD = DE$, then, as angles opposite to equal sides are equal, $\angle DEA = \angle DAE$.

In triangle DAE,

$\angle ADE + \angle DEA + \angle DAE = 180^\circ$,

$150^\circ + 2\angle DEA = 180^\circ$.

We get, $\angle DEA = \angle DAE = 15^\circ$.

QED