# C.E.M.TUITION

**Name :**__________________________________

**Review Topic : Applications of Geometrical Properties**

Year 12 - Mathematics

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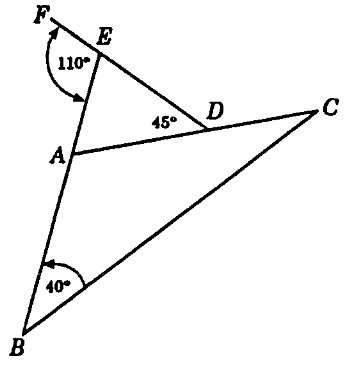
**1.**

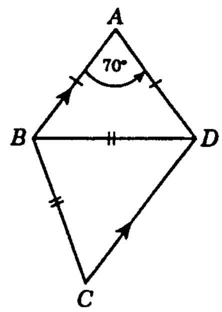


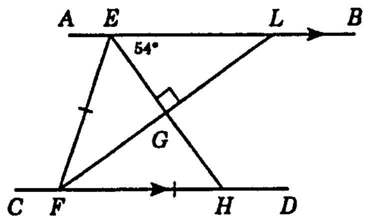

In the figure, $B\hat{E}F = 110°$, $E\hat{B}C = 40°$, $A\hat{D}E = 45°$. $AC$, $FD$ and $EB$ are straight lines. Find the size of $B\hat{C}A$.

Give reasons.

**2.** In the diagram, $AB = AD$, $BC = BD$, $AB \parallel DC$ and $D\hat{A}B = 70°$.

Find the size of $A\hat{B}C$, giving reasons.



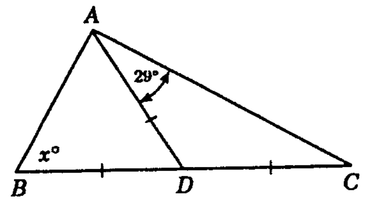
3. 


In the figure, $AB \parallel CD$, $EG \perp GL$, $EF = FH$, and $\angle LEG = 54°$.

Calculate, giving reasons, the size of:

**(a)** $G\hat{H}D$ **(b)** $E\hat{F}L$

**4.**




In the figure $BC$ is a straight line, $AD = DC$, $AD = BD$ and $C\hat{A}D = 29°$.

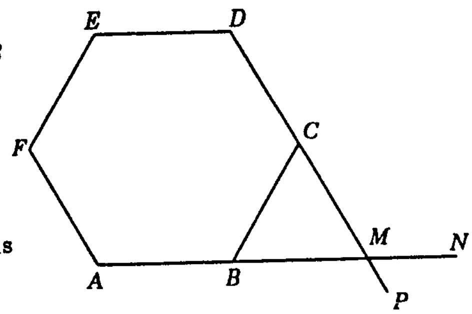
Find $x$, giving reasons.

**5.** In the figure, $ABCDEF$ is a regular hexagon. $DC$ and $AB$ are produced to $P$ and $N$ respectively.

Deduce the size of:

**(a)** $F\hat{A}B$

**(b)** $N\hat{M}P$, giving full reasons to justify your answer.



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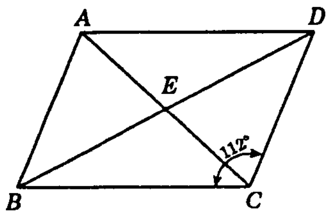



In the figure, $ABCD$ is a rhombus whose diagonals intersect at $E$.

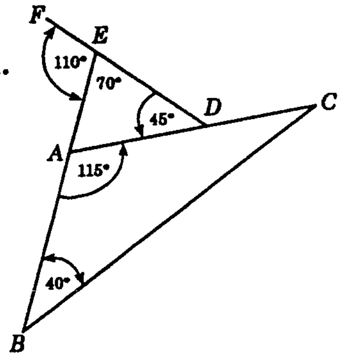
If $B\hat{C}D = 112°$, find the size of:

**(a)** $A\hat{E}D$

**(b)** $A\hat{B}D$

(Give reasons.)

**1.**



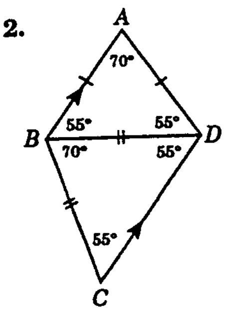

$D\hat{E}A = 70°$ (supplementary to $B\hat{E}F$)

$C\hat{A}B = 115°$ (exterior angle of triangle $ADE$)

$B\hat{C}A = 180° - (40 + 115)°$ (angle sum of $\Delta ABC$)

$\therefore\ B\hat{C}A = 25°$.

**2.**




$A\hat{B}D = B\hat{D}A = 55°$ (base angles of isosceles $\Delta ABD$)

$C\hat{D}B = 55°$ (alternate to $A\hat{B}D$ and $AB \parallel DC$)

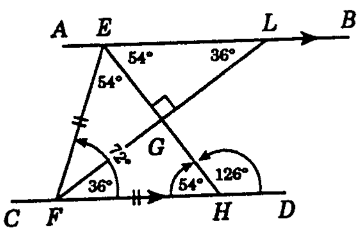
$D\hat{C}B = C\hat{D}B = 55°$ (base angles of isosceles $\Delta BCD$)

$D\hat{B}C = 70°$ (angle sum of $\Delta BCD$)

$A\hat{B}C = A\hat{B}D + D\hat{B}C$
$= 55° + 70°$
$= 125°$,

$\therefore\ A\hat{B}C = 125°$.

**3.**




**(a)** $F\hat{H}G = 54°$ (alternate to $L\hat{E}G$ and $AB \parallel CD$)

$G\hat{H}D = (180 - 54)°$ (supplementary to $F\hat{H}G$)

$\therefore\ G\hat{H}D = 126°$.

**(b)** $G\hat{L}E = 36°$ (angle sum of $\Delta GLE$)

$H\hat{E}F = F\hat{H}G = 54°$ (base angle of isosceles $\Delta EFH$)

$E\hat{F}H = 72°$ (angle sum of $\Delta EFH$)

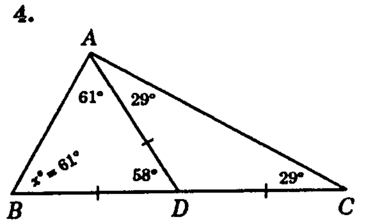
$L\hat{F}H = 36°$ (alternate to $G\hat{L}E$ and $AB \parallel CD$)

$E\hat{F}L + L\hat{F}H = E\hat{F}H$

$\therefore\ E\hat{F}L + 36° = 72°$

$\therefore\ E\hat{F}L = 36°$.

**4.**




$D\hat{C}A = 29°$ (base angles of isosceles $\Delta ADC$)

$B\hat{D}A = 58°$ (exterior angle of $\Delta ADC$)

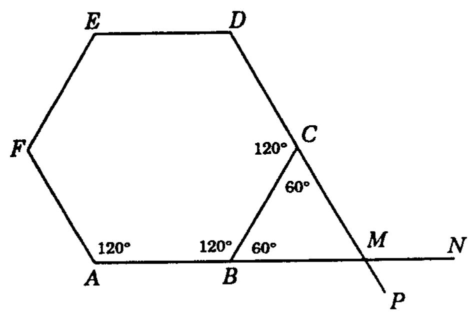
$A\hat{B}D = D\hat{A}B = 61°$ (base angles of isosceles $\Delta ABD$)

$\therefore\ x = 61$.

**5. (a)** $F\hat{A}B = \dfrac{(2n-4)\times 90°}{n}$

[angle in a regular hexagon $(n = 6)$]

$\therefore\ F\hat{A}B = \dfrac{(2\times 6 - 4)\times 90°}{6}$
$= 120°$.




**(b)** $A\hat{B}C = F\hat{A}B$ (angle in a regular hexagon)

$\therefore\ A\hat{B}C = 120°$.

$B\hat{C}D = 120°$ (angle in a regular hexagon)

$C\hat{B}M = 60°$ (supplementary to $A\hat{B}C$)

$M\hat{C}B = 60°$ (supplementary to $B\hat{C}D$)

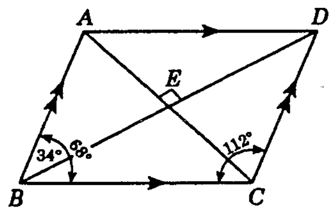
$B\hat{M}C = 60°$ (angle sum of $\Delta CBM$)

$N\hat{M}P = 60°$ (vertically opposite to $B\hat{M}C$)

$\therefore\ N\hat{M}P = 60°$.

**6. (a)** $A\hat{E}D = 90°$

(diagonals of a rhombus bisect at right angles).




**(b)** $A\hat{B}C = (180 - 112)°$ (co - interior to $B\hat{C}D$ and $AB \parallel DC$)

$= 68°$,

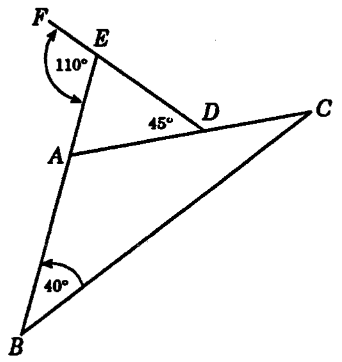
$A\hat{B}D = \frac{1}{2} A\hat{B}C$ (diagonals of rhombus bisect the angles through which they pass)

$= \frac{1}{2} \times 68°$

$= 34°$,

$\therefore A\hat{B}D = 34°$.

**1.**

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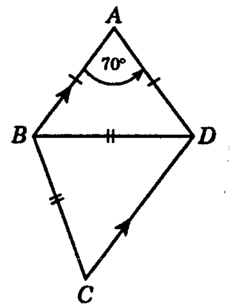

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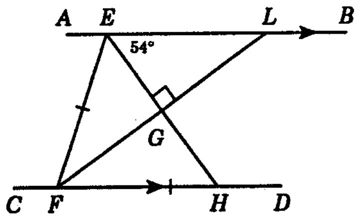


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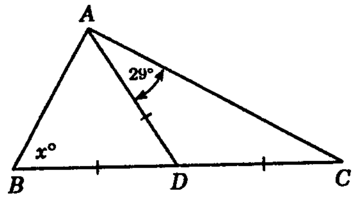


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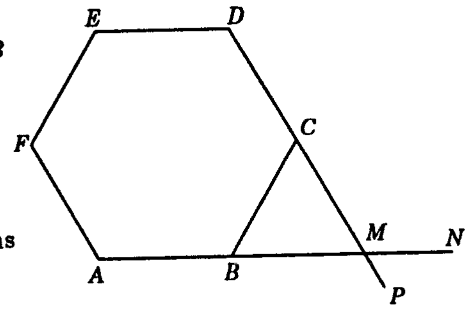

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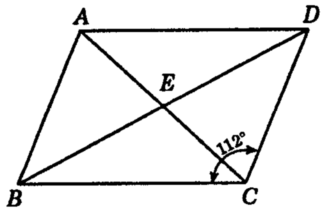


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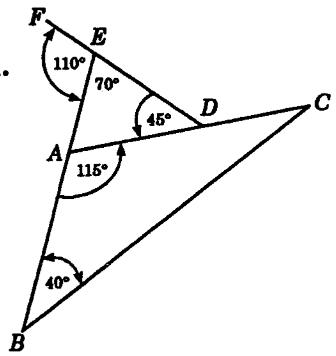


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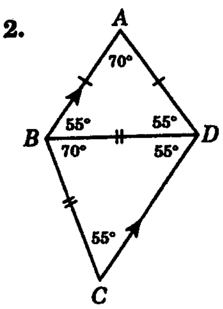


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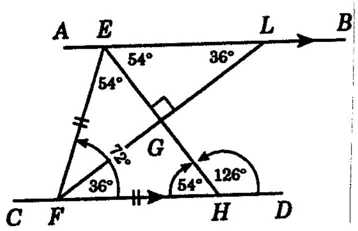


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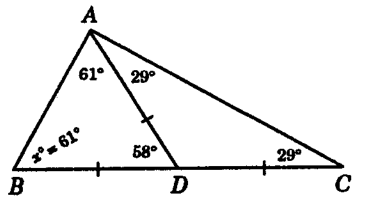


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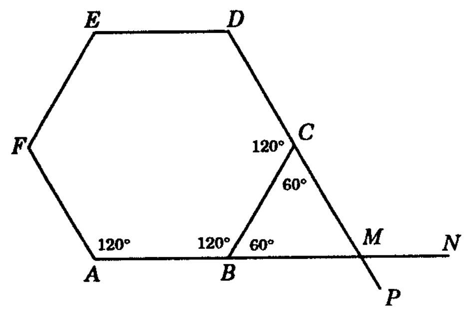


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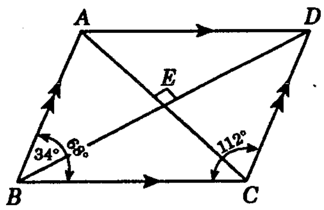


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