ANGLES IN TRIANGLE AND POLYGON

Form 2 Regular Course

Vol 4

Part 4 - Angles in polygon

1. (g) by constructing a diagonal and considering the two congruent triangles,

$x = 90^\circ$ (corr. $\angle$s, $\cong \Delta$s)

(h) $60^\circ + 100^\circ + x + y = 360^\circ$ ($\angle$ sum of polygon)

$x + y = 200^\circ \quad -(1)$

$y + x + 100^\circ + y + 2x = 540^\circ$ ($\angle$ sum of polygon)

$3x + 2y = 440^\circ \quad -(2)$

Solving $(1),(2)$ gives $x = 40^\circ$, $y = 160^\circ$

(i) $(180^\circ - x) + (180^\circ - 85^\circ) + 27^\circ + (180^\circ - 45^\circ) = 360^\circ$

($\angle$ sum of polygon)

$x = 77^\circ$

(j) $(180^\circ - 145^\circ) + (360^\circ - 4y) + y + (360^\circ - 320^\circ) = 360^\circ$

($\angle$ sum of polygon)

$y = 25^\circ$

2. (e) $3x + 3x + 2x + 2x + (180^\circ - 7x) + 3x + 4x = 360^\circ$

(sum of ext. $\angle$s of polygon)

$x = 18^\circ$

(f) $90^\circ + 50^\circ + 4x - 5^\circ + x + x + 3x = 360^\circ$ (sum of ext. $\angle$s of polygon)

$x = 25^\circ$

5. $\angle FDC = 60°$

$5\angle CDE = 5\angle AED = 540°$ ($\angle$ sum of polygon)

$\angle CDE = \angle AED = 108°$

$\angle FDE = 48°$

$\angle DFE = \angle DEF$ (base $\angle$s, isos. Δ)

$\angle DEF = 66°$

$x = 108° - 66° = 42°$

6. (a) $8\angle GHA = 6 \times 360°$ ($\angle$ sum of polygon)

$\angle GHA = 135°$

$6\angle AHL = 4 \times 180°$ ($\angle$ sum of polygon)

$\angle AHL = 120°$

$\angle GHL = 135° - 120° = 15°$

(b) $\angle HLG = \angle HGL$ (base $\angle$s, isos. Δ)

$2\angle HGL + 15 = 180°$ ($\angle$ sum of Δ)

$\angle HGL = 82.5°$

7. (a) $\frac{360°}{6} = 60°$

(b) $\frac{360°}{20} = 18°$

8. let n the number of sides,

$\frac{(n-2)\times 180°}{n} = 3 \times \frac{360°}{n}$

$n = 8$

therefore, the sides is 8

9. let n be the number of sides,

$\frac{(n-2)\times 180°}{n} - 6 \times \frac{360°}{n} = 12°$

$n = 15$

therefore, the sides is 15

10. let n ne the number of sides,

$360° = \frac{2}{3}(n-2)\times 180°$

$n = 5$

therefore, the size of each exterior angle $\frac{360°}{5} = 72°$

11. (a) $\angle \text{FJI} = 540° - f - g - h - i$ ($\angle$ sum of polygon)

$\angle \text{AJF} = \angle \text{EJI} = 180° - \angle \text{FJI}$ (adj. $\angle$s on st. line)

$a + b + c + d + e + 2\angle \text{AJF} + \angle \text{FJI} = 720°$ ($\angle$ sum of polygon)

$a + b + c + d + e + f + g + h + i = 900°$

(c) Considering the bottom-right triangle,

$(a + c) + d + (b + e) = 180°$ ($\angle$ sum of Δ)

$a + b + c + d + e = 180°$

(e) Considering the two triangles,

sum $= 360°$