NAME: ____________

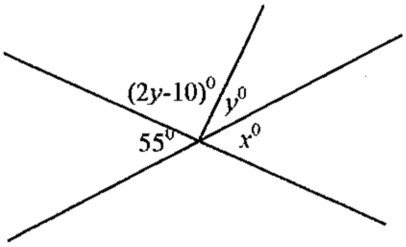
S.S.H.S. - Year 10 Assessment – June 02
Plane Geometry

Time allowed: 1 Hour

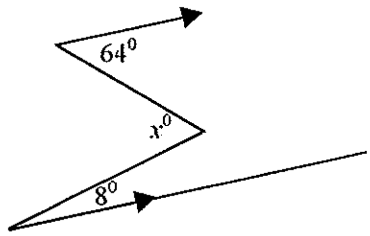
Answer the following in the given space. Show all necessary working.

1. Find the values of all pronumerals, giving reasons for your answers. (28 marks)

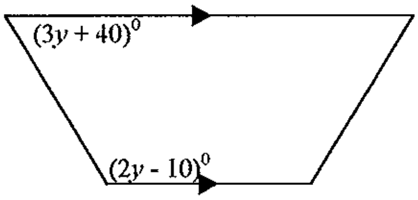
(a)



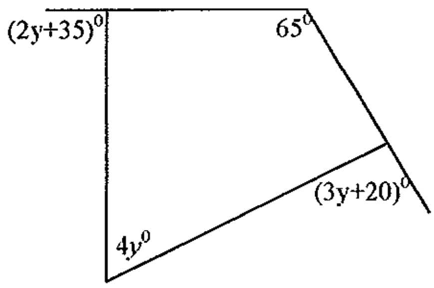
(b)



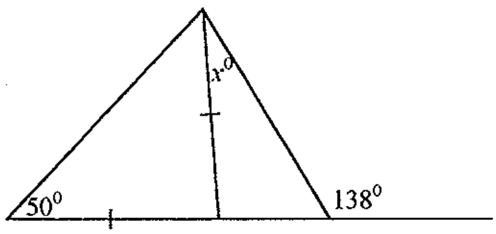
(c)



(d)



(e)



(f)

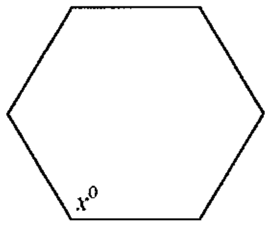
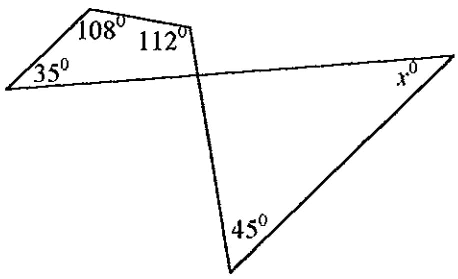


Figure shown is a regular hexagon.

(g)

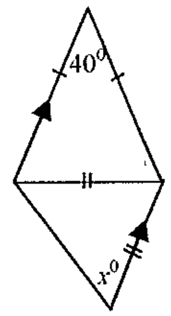


(h) If each interior angle of an n-sided polygon is 160^0, find the value of n.

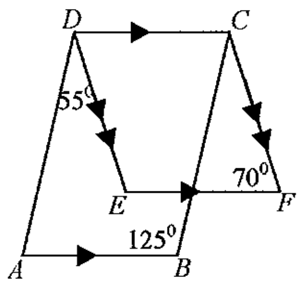
2. (a) Name **two** special properties of a rhombus which do not belong to a parallelogram. (2 marks)

(b) Give **two** special properties of a parallelogram. (2 marks)

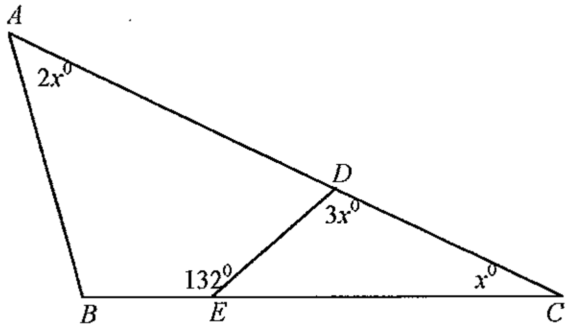
3. Find the value of x in the diagram below, giving reasons. (4 marks)



4. Given that *CDEF* is a parallelogram, show that *ABCD* is also a parallelogram. (5 marks)



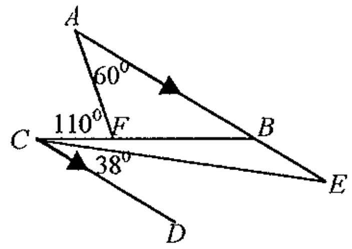
5. Use the information given in the diagram to find: (4 marks)



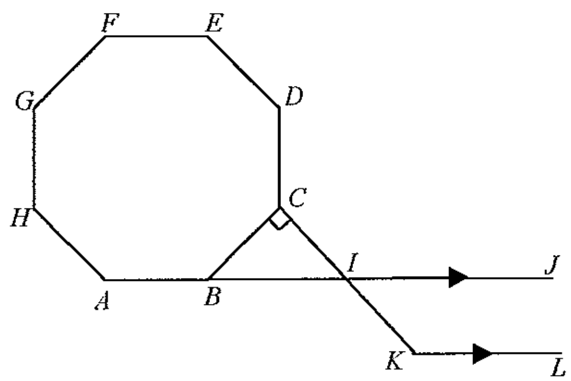
(i) the value of x

(ii) the size of $\angle ABE$

6. In the diagram below, $AB \parallel CD, \angle A = 60^0, \angle CFA = 110^0$ $\angle DCE = 38^0$, find $\angle BCE$ giving reasons for your answers. (5 marks)



7. The figure below shows a regular polygon $ABCDEFGH$ and $BJ \parallel KL$. (8marks)



(i) What is the name given to this regular polygon $ABCDEFG$?

(ii) Find the size of $\angle HAB$ giving reasons.

(iii) Find the size of $\angle CBJ$ and hence the size of $\angle IKL$ giving reasons for your answers.

End of assessment.

100% Excellent effort!

NAME: Jeannie

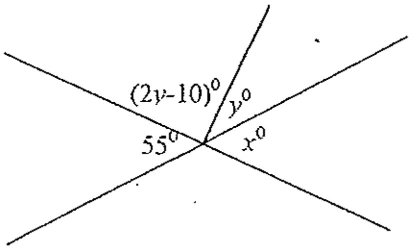
S.S.H.S. - Year 10 Assessment – June 02
Plane Geometry

Time allowed: 1 Hour

Answer the following in the given space. Show all necessary working.

1. Find the values of all pronumerals, giving reasons for your answers. (28 marks)

(a)



$55^\circ + (2y-10)^\circ + y = 180$ (adj ∠s on a st. line)

$55 + 2y - 10 + y = 180$

$3y = 135$

$y = 45$ ✓

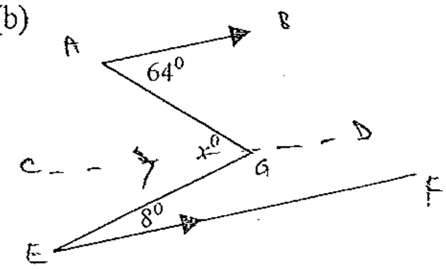
$2y - 10 + y + x = 180$ (adj ∠s on a st. line)

$y = 45$ (proved)

$90 - 10 + 45 + x = 180$

$x = 55$ ✓

(b)



Produce CD ∥ AB ∥ EF

∴ ∠AGC = 64° (alt ∠s, AB ∥ CD)

∠CGE = 8° ✓ (alt ∠s, CD ∥ EF) ✓

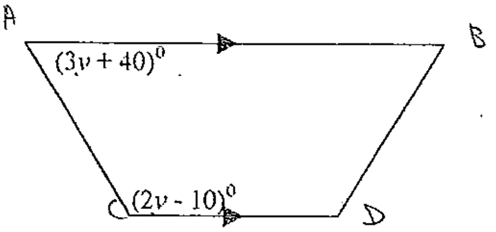
∴ x = ∠AGC + ∠CGE ✓

∴ x = 8 + 64

= 72

8

(c)



$\because$ AB // CD (given)

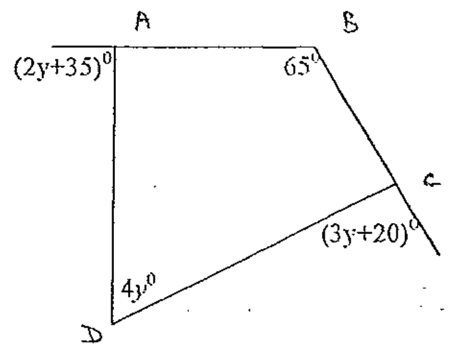
$\therefore 3y + 40 + 2y - 10 = 180$ (co-int $\angle$s, AB // CD)

$5y + 30 = 180$

$5y = 150$

$\therefore y = 30$

(d)



$\angle$ BAD $= 180 - (2y + 35)$ (adj $\angle$s on a st line)

$\angle$ BAD $= 145 - 2y$

$\angle$ BCD $= 180 - (3y + 20)$ (adj $\angle$s on a st line

$\angle$ BCD $= 160 - 3y$

$\because 65 + 4y + (145 - 2y) + (160 - 3y)$

$= (4-2) \times 180^\circ$ (sum of int $\angle$s of quadrilateral

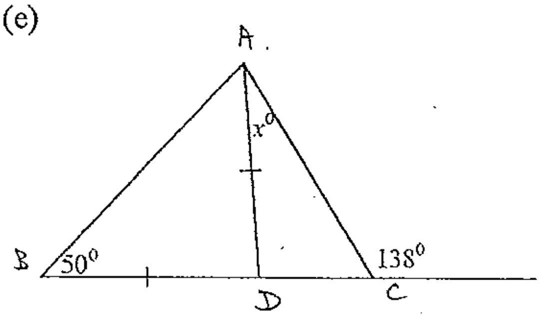
$\therefore 65 + 4y + 145 - 2y + 160 - 3y = 360$

$370 - y = 360$

$\therefore y = 10$

7

(e)



$\because$ AD = BD (given)

$\therefore$ ∠ DBA = ∠ DAB = 50° (isos. △)

$\because$ ∠ DBA + ∠ DAB + ∠ ADB = 180° (∠ sum of △)

$\therefore$ 50° + 50° + ∠ ADB = 180°

∠ ADB = 80°

$\because$ ∠ ADB + ∠ ADC = 180° (adj ∠s on a st. line)

$\therefore$ ∠ ADC = 180° − 80°

= 100°

∠ ADC + x° = 138° (ext ∠s of △)

$\therefore$ 100° + x° = 138°

$\therefore$ x = 38°

(f)

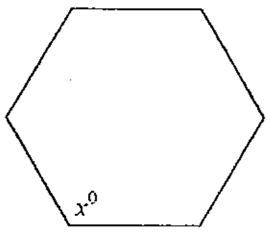


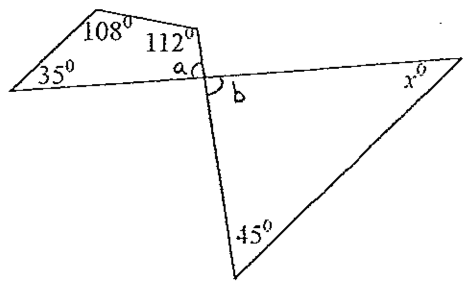
Figure shown is a regular hexagon.

6x = (6 − 2) × 180° (sum of int ∠s of hexagon)

6x = 720

$\therefore$ x = 120

(g)



a + 108 + 112 + 35 = (4 − 2) × 180° (sum of int ∠s of quilateral)

$\therefore$ a + 255 = 360

$\therefore$ a = 105

$\therefore$ b = 105 (vert opp ∠s)

$\because$ b + 45 + x = 180 (∠ sum of △)

$\therefore$ x = 180 − 45 − b

= 30

10

(h) If each interior angle of an n-sided polygon is 160^0, find the value of n.

$(n-2) \times 180 = 160n$ (sum of int ∠s of polygon)

$180n - 360 = 160n$

$20n = 360$

$\therefore n = 18$

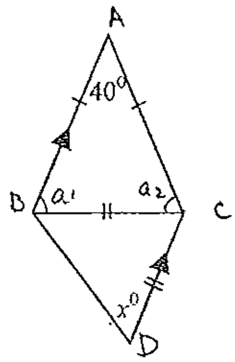
2. (a) Name **two** special properties of a rhombus which do not belong to a parallelogram. (2 marks)

- diagonals bisect each other
- diagonals bisect the vertex angles.

(b) Give **two** special properties of a parallelogram. (2 marks)

- opp ∠s are equal
- opp sides are equal and //

3. Find the value of x in the diagram below, giving reasons. (4 marks)



$\because AB = AC$ (given)

$a_1 = a_2$ (isos. △)

$\therefore 40 + 2a = 180$ (∠ sum of △)

$a = 70$

$\because a_1 = \angle BCD$ (alt ∠s, AB // CD)

$CB = CD$ (given)

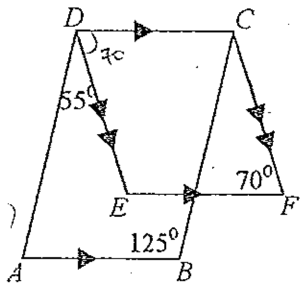
$\therefore \angle CBD = x$

$\therefore \angle BCD + \angle CBD + \angle CDB = 180$ (∠ sum of △)

$70 + 2x = 180$

$\therefore x = 55$

4. Given that *CDEF* is a parallelogram, show that *ABCD* is also a parallelogram. (5 marks)



∵ CDEF is a // gram

∴ ∠ CDE = 70 (opp ∠s are equal)

∴ ∠ADC = 55 + 70
= 125

∴ ∠ ADC = ∠ ABC = 125°

∵ DC // AB (given)

∴ ∠ DCB + 125 = 180 (co- int ∠, DC // AB)

∴ ∠DCB = 55

∠ DAB + ∠ ADC = 180° (co - int ∠, DC // AB)

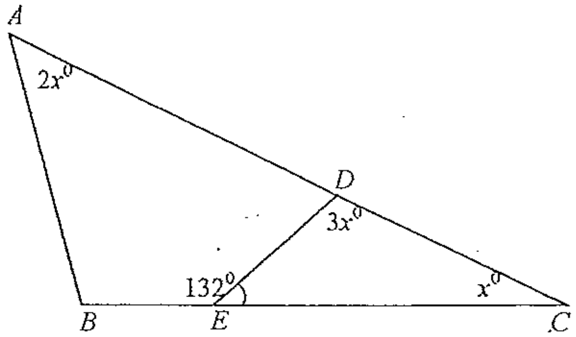
∴ ∠DAB + 125 = 180

∴ ∠DAB = 55

∴ ∠ DAB = ∠ DCB

∴ ABCD is a // gram

5. Use the information given in the diagram to find: (4 marks)



(i) the value of x

132 + ∠ DEC = 180 (adj ∠s on a st. line)

∴ ∠ DEC = 48

∴ 48 + 3x + x = 180 (∠s sum of △)

4x = 132

∴ x = 33

(ii) the size of $\angle ABE$

∴ ∠ ABE + 2x + x = 180 (∠s sum of △)

x = 33 (proved in i)

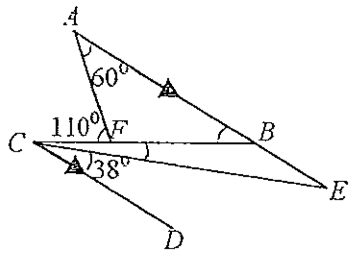
∠ABE + 3x = 180

∠ ABE + 99 = 180

∴ ∠ ABE = 81

9

6. In the diagram below, $AB \parallel CD, \angle A = 60^0, \angle CFA = 110^0$ $\angle DCE = 38^0$, find $\angle BCE$ giving reasons for your answers. (5 marks)



$\because 60 + \angle ABF = 110$ (ext $\angle$s of $\triangle$)

$\therefore \angle ABF = 50$

$\because \angle ABF = \angle BCD$ (alt $\angle$s, AB//CD)

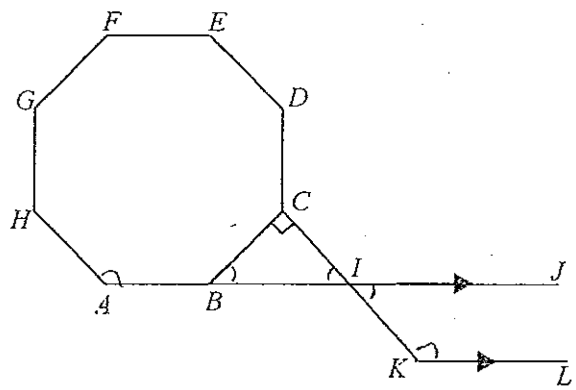
$\therefore \angle BCD = 50$

$\because \angle BCE + \angle ECD = \angle BCD$ (given)

$\therefore \angle BCE + 38 = 50$

$\therefore \angle BCE = 12$ //

7. The figure below shows a regular polygon *ABCDEFGH* and $BJ \parallel KL$. (8marks)



(i) What is the name given to this regular polygon *ABCDEFG*?

Octagon

(ii) Find the size of $\angle HAB$ giving reasons.

$(8-2) \times 180° = 1080$ (sum of int $\angle$s of the polygon

$\therefore \angle HAB = 1080 \div 8$

$= 135°$ //

(iii) Find the size of $\angle CBJ$ and hence the size of $\angle IKL$ giving reasons for your answers.

$\because$ it is a regular polygon

$\therefore \angle HAB = \angle ABC = 135$

$\because 135 + \angle CBJ = 180$ (adj $\angle$s on a st. line)

$\therefore \angle CBJ = 45$

$\because 45 + 90 + \angle CIB = 180$ ($\angle$s sum of $\triangle$

$\therefore \angle CIB = 45$

$\angle JIK = \angle CIB = 45$ (vert. opp. $\angle$s

$\because \angle JIK + \angle IKL = 180$ (co-int $\angle$s IJ ∥ KL)

$\therefore 45 + \angle IKL = 180$

$\therefore \angle IKL = 135$ //

13

End of assessment.