SGHS - CLASS TEST 07

Year 11 Geometry Test. Name:

Friday, 23rd March, 2007.

Time Allowed: 1 period.

Answer all questions on your writing paper.

Total Marks 55

Question 1 (8 marks)

Answer the following with a clear and concise sentence.

Illustrate with as diagram.

a) What are concurrent lines? 2

b) What are collinear points? 2

c) What are adjacent angles? 2

d) What are alternate angles? 2

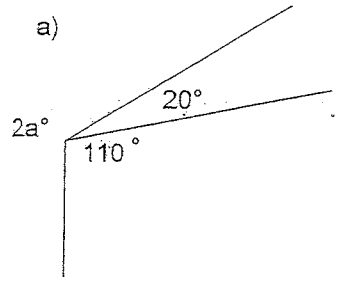
Question 2 (13 marks)

Find the value of the pronumeral in each of the following diagrams.

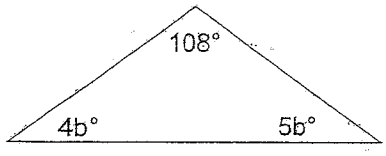
Give all reasons.

Copy diagrams for 2c, d, e.

a)

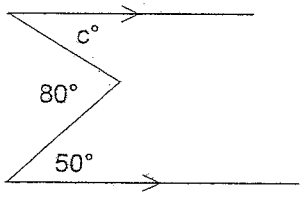


b)

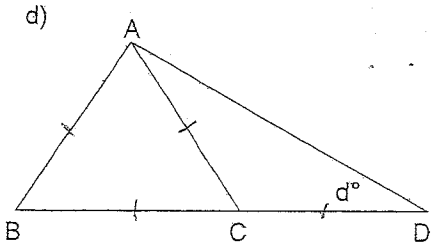


2, 2

c)



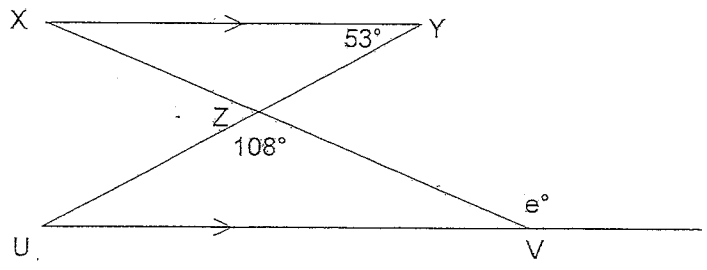
d)



AB = BC = CA =CD

3, 3

e)



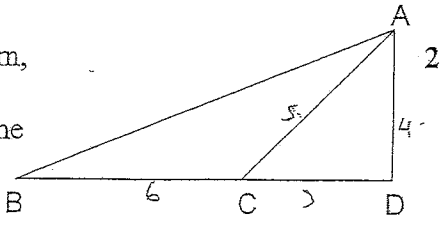
3

Question 3 (9 marks)

a) In the diagram AD = 4 cm, AC = 5 cm, BC = 6 cm, & ∠ADC = 90°

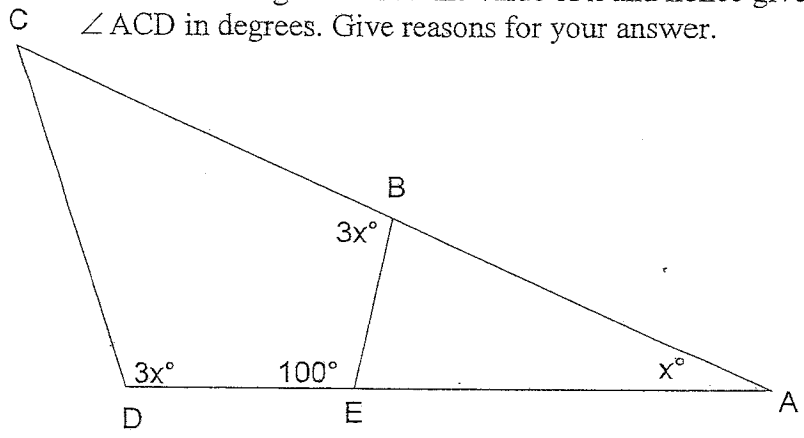
i) Copy the diagram and mark the information on it.

ii) Find the area of ΔABC.



2

b) As shown in the figure (which is not to scale), B and E lie on the sides AC, DA respectively of ΔACD. Use the information shown on the figure to find the value of x and hence give $\angle ACD$ in degrees. Give reasons for your answer. **3**



c) For a parallelogram

i) State the definition of a parallelogram. **1**

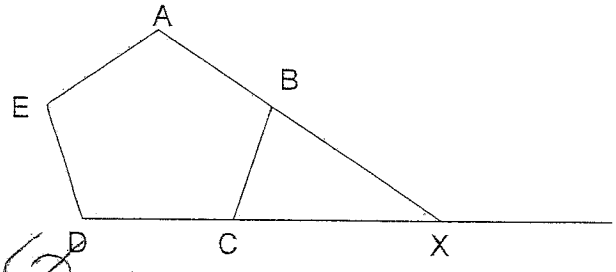
ii) State three properties of a parallelogram. **3**

Question 4 (10 marks)

a) In the diagram ABCDE is a regular pentagon and AB and DC produced meet at X

i) Copy the diagram onto your answer sheet and find the size of $\angle ABC$. **2**

ii) Find the size of $\angle BCX$ giving reasons.. **1**



b) ABCD is a quadrilateral.
The diagonals AC and BD intersect at P.
AD = BC and AC = BD.

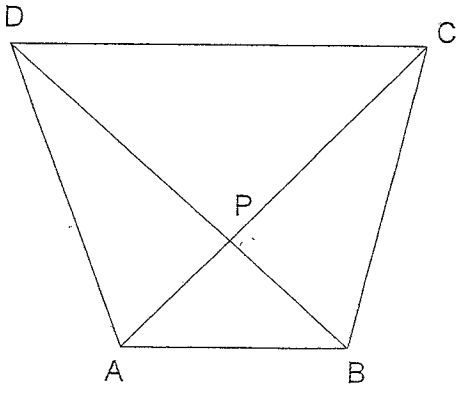
i) Copy the diagram and mark the information on it.. **1**

ii) Show that triangles ABC and BAD are congruent. **2**

iii) Show that triangle ABP is isosceles. **2**

iv) Hence show that triangle CDP is isosceles. **2**

NOT TO SCALE



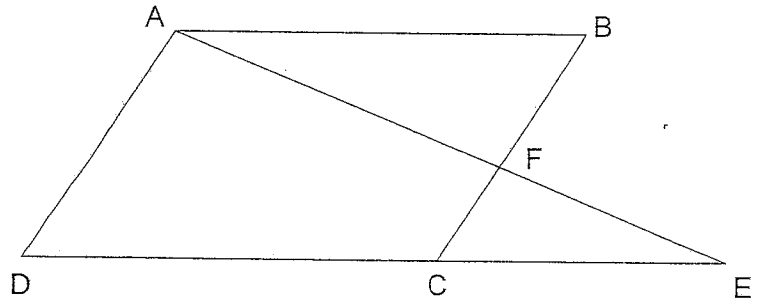
Question 5 (15 marks)

a) ABCD is a parallelogram. AD = 12 cm, CE = 4 cm and BF = 7 cm.

i) Copy the diagram and mark the information. 1

ii) Show that ΔABF is similar to ΔECF. 2

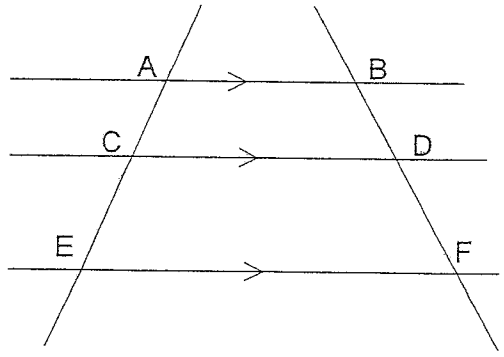
iii) Find the length of AB. 2



b) Given AB // CD, CD // EF, AC = 2 m, CE = 3 m & DF = 4 m.

i) Draw a diagram and mark all the given information. 1

ii) Find BF giving reasons. 2



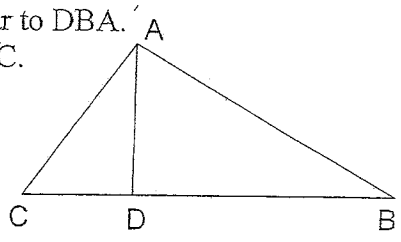
c) ABC is a triangle, right angled at A, and AD is drawn perpendicular to BC.
AB = 15 cm and AD = 12 cm.

i) On your answer sheet, draw a neat sketch and mark all the given information. 1

ii) Calculate the length of BD. 2

iii) Prove ABC is similar to DBA. 2

iv) Find the length of AC. 2



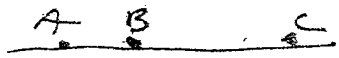
$\frac{7}{5} = \frac{AB}{4}$

$\frac{2}{3} = \frac{BD}{4}$

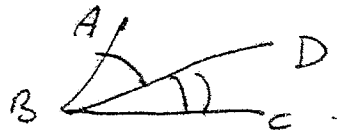
concurrent lines

1a) More than 2 lines passing through the same point

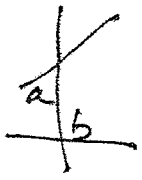
b) collinear points – more than 2 points that lie in ~~the~~ a straight line.



c) adjacent angles have a common arm and a common vertex and lie on opposite sides of the common arm.



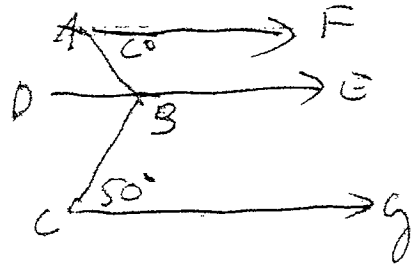
d) When two lines are crossed by a transversal the alternate angles lie on opposite sides of the transversal, and between the two lines



2a) $2a + 20 + 110 = 360$ (angles at a point)
$2a + 130 = 360$
$2a = 230$
$a = 115$

b) $4b + 5b + 108 = 180$ (angle sum of triangle)
$9b = 180 - 108$
$9b = 72$
$b = 8$

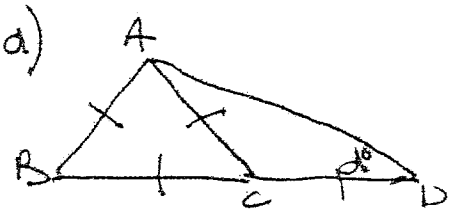
c)



Draw $DE \parallel AF$ through B.

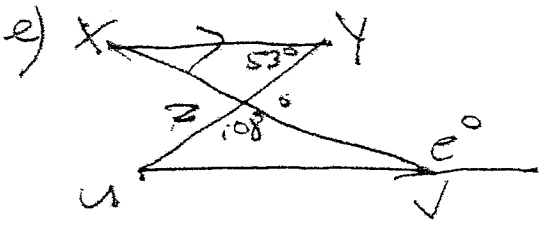
$\angle ABD = C°$ ($AF \parallel DE$, eq. alt. $\angle$)
$\angle CBD = 50°$ ($DE \parallel CG$ ")
$\angle ABC = C° + 50°$
but $\angle ABC = 80°$
$\therefore C + 50 = 80$
$\therefore C = 30$

d)



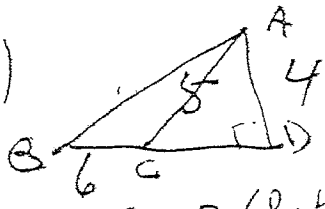
$\angle ACB = 60°$ (angle in equilateral $\triangle$)
$\angle CAD = d°$ (angles opposite equal sides)
$\angle ACB = \angle CAD + \angle ADC$ (exterior angle of Triangle)
$60° = d° + d°$
$d = 30$

e)



$\angle ZUX = 53°$ ($XY \parallel UV$ eq. alt. $\angle$s)
$e° = 53° + 108°$ (exterior angle of triangle)
$e = 161$

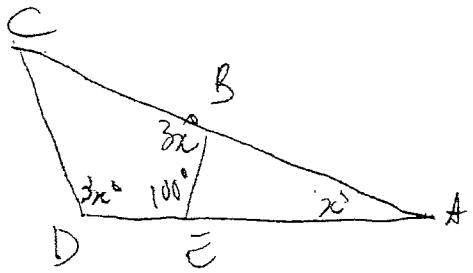
3a) i)



$CD = 3$ (Pythagoras)

ii) Area $\triangle ABD = \frac{1}{2} \times 6 \times 6 = 18\text{ cm}^2$
Area $\triangle ACD = \frac{1}{2} \times 4 \times 3 = 6\text{ cm}^2$
Area $\triangle ABC = 18 - 6$ ✓

b)



$\angle C + 3x^\circ + x^\circ = 180^\circ$ (angle sum of $\triangle$)

$\angle C = 180^\circ - 4x^\circ$

$3x^\circ + 3x^\circ + 100^\circ + (180^\circ - 4x^\circ) = 360^\circ$

Angle sum of quadrilateral

$2x^\circ + 280^\circ = 360^\circ$

$2x^\circ = 80^\circ$

$x^\circ = 40^\circ$

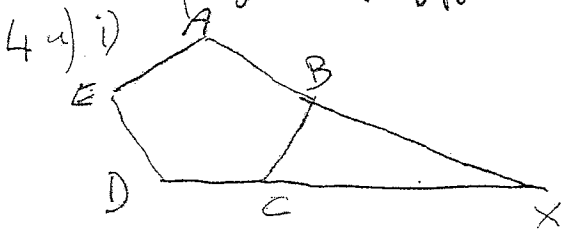
$x = 40$

$\angle ACD = 180^\circ - 4 \times 40^\circ = 180^\circ - 160^\circ = 20^\circ$

c) i) a parallelogram is a quadrilateral with opposite sides parallel.

ii) Opposite sides equal
opposite angles equal
diagonals bisect each other.

4 a) i)



$n = 5$, Angle Sum $= (n-2) \times 90^\circ$

$= 3 \times 180^\circ$

$= 540^\circ$

$\angle ABC = \frac{540^\circ}{5}$

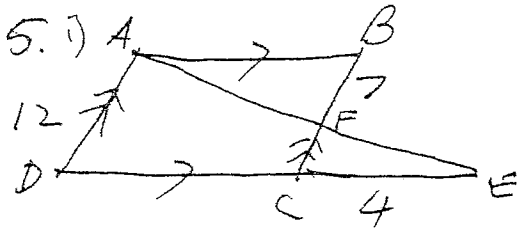
$= 108^\circ$

ii) $\angle BCD = 108^\circ$ (regular pentagon all angles equal)

$\angle BCX + 108^\circ = 180^\circ$ (straight angle)

$\angle BCX = 72^\circ$

5. i)



ii) $\angle ABF = \angle BCE$ ($AB \parallel CE$ equal alternate angles)

$\angle BAF = \angle CEF$ (")

$\angle AFB = \angle CFE$ (vertically opposite)

$\therefore \triangle ABF \equiv \triangle ECF$ (equiangular)

iii) $\frac{AB}{EC} = \frac{AF}{EF} = \frac{BF}{CF}$

$\frac{AB}{4} = \frac{AF}{EF} = \frac{7}{CF}$

$AD = BC$ (opp. sides of parallelogram)

$\therefore BC = 12$

$CF + 7 = 12$

$\therefore CF = 5$

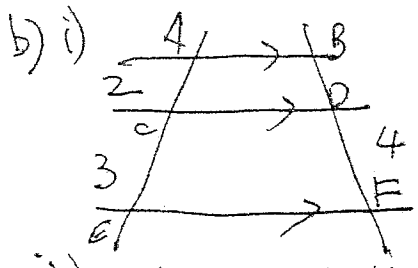
$\frac{AB}{4} = \frac{7}{5}$

$AB = \frac{7}{5} \times 4$

$= \frac{28}{5}$ cm

$\therefore AB = 5\frac{3}{5}$

b) i)



ii) $\frac{AC}{CE} = \frac{BD}{DF}$ (intercepts in same ratio)

$\frac{2}{3} = \frac{BD}{4}$

$BD = \frac{2}{3} \times 4$

$= 8/3$

$= 2\frac{2}{3}$

$\therefore BF = 2\frac{2}{3} + 4$

$= 6\frac{2}{3}$ cm