SHARP

Worksheet 27: Revision Term 2

Grade 9 Mathematics

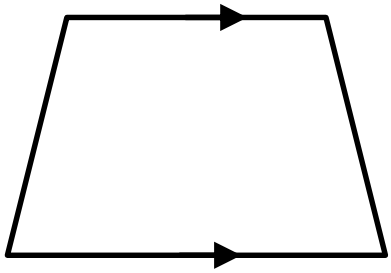
1. Construct the following using only your compass, pencil and ruler:

   a) An equilateral triangle with sides of length 4cm.

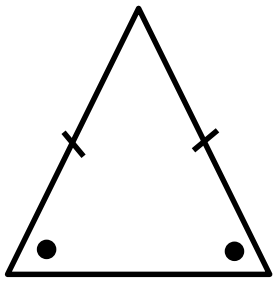
   b) Draw a rhombus with sides 5cm and one set of opposite angles at 45°

2. Identify the following shapes and give two reasons why for each shape:

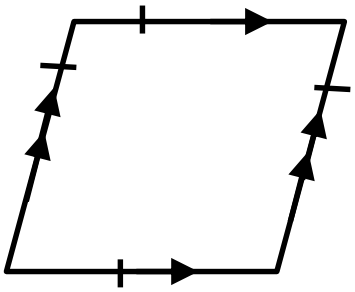
   a)



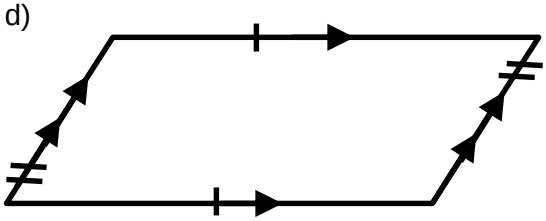
   b)



   c)



   d)



3. How do the diagonals in each of the following shapes behave?

   For example: The diagonals in a square bisect each other at 90°, they are equal in length and they bisect the angles of the square into 45° angles.

   a) rectangle

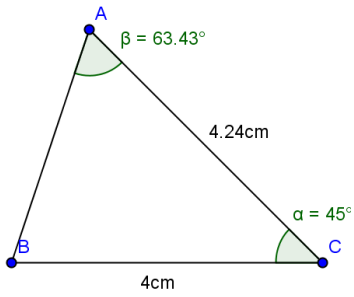
   b) rhombus

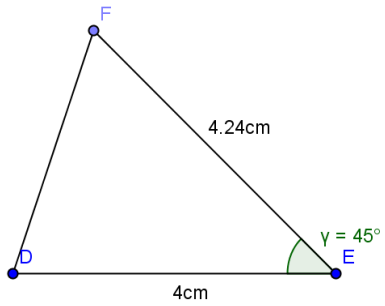
   c) parallelogram

   d) kite

4. Say whether the following triangles are similar, congruent or neither and give proof:

a)





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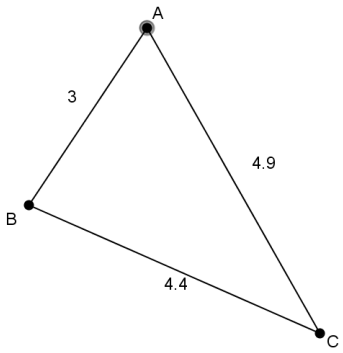

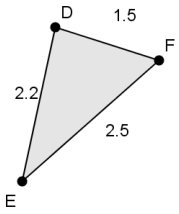

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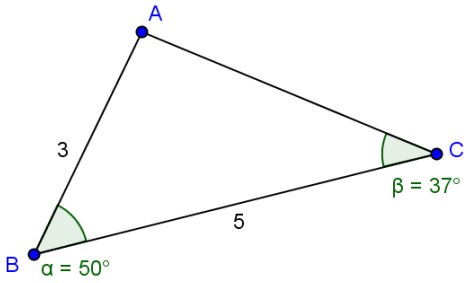

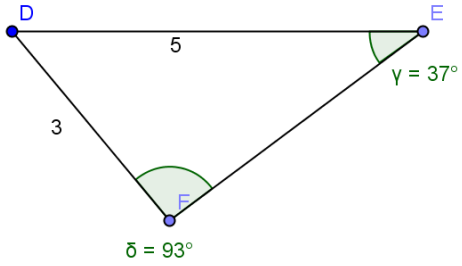

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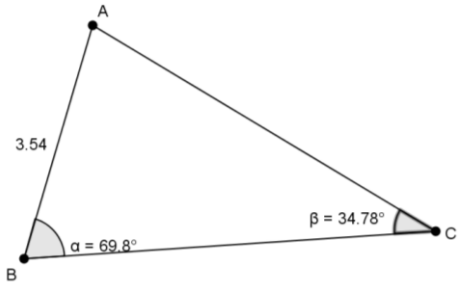

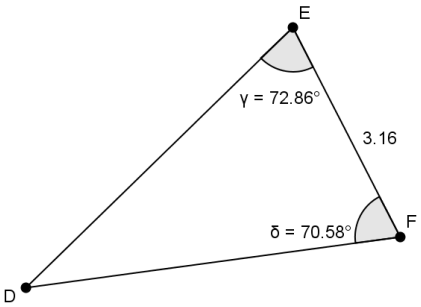

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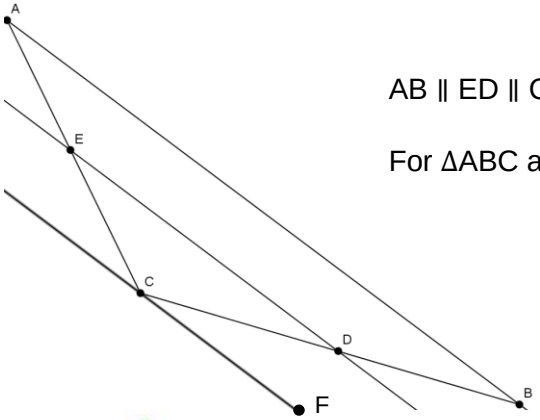
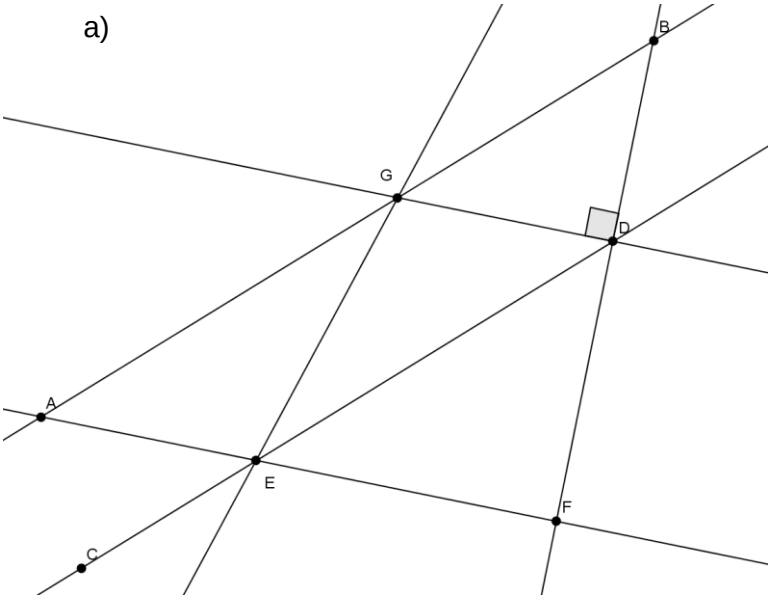


AB ∥ ED ∥ CF

For ΔABC and ΔCDE

5. For each of the following questions, study the diagrams carefully before answering the question. Make sure that you give a valid reason for each statement you make.

a)



In the diagram on the left, AB is parallel to CD, AF is parallel to GD, and GD is perpendicular to BF.

i) Prove that ΔBDG is similar to ΔDFE.

ii) Hence, or otherwise, prove that ΔBDG is similar to ΔBFA.

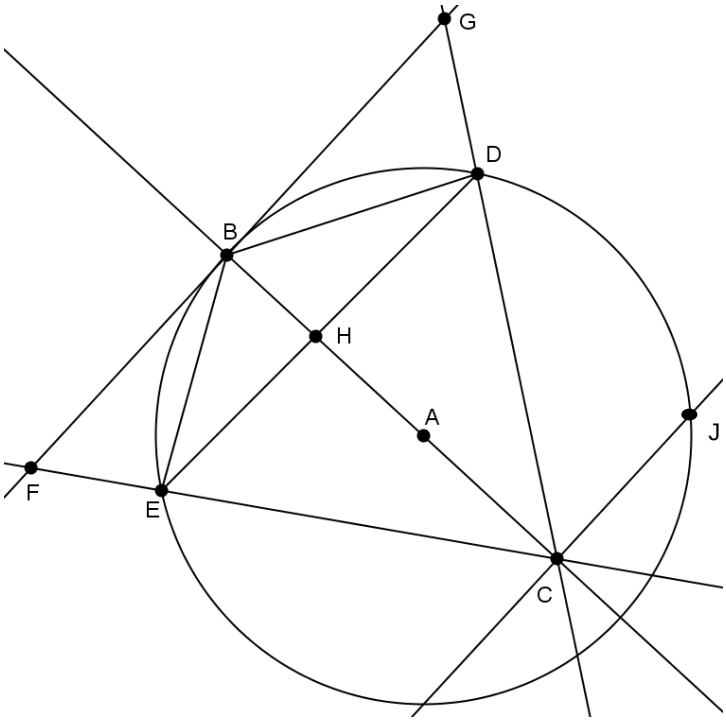
iii) Is ΔAGE congruent with ΔGED? Give reasons for your answer.

iv) What type of quadrilateral is AEDG?

v) Given that AF is 12 cm, BF is 18cm and that the ratio of BD: DF is 4: 5. Determine the area of ΔBDG.

vi) Hence, or otherwise, find the length of AG.

b) In the diagram below, A is the center of the circle where points B, D, E and J lie on the circumference. BC is perpendicular to FG. FG is parallel to ED and CJ.



i) Given that EH = HD, prove that ΔEHC is congruent to ΔDHC.

ii) Prove that BECD is a kite.

iii) Prove that $F\hat{B}E = G\hat{B}D$.

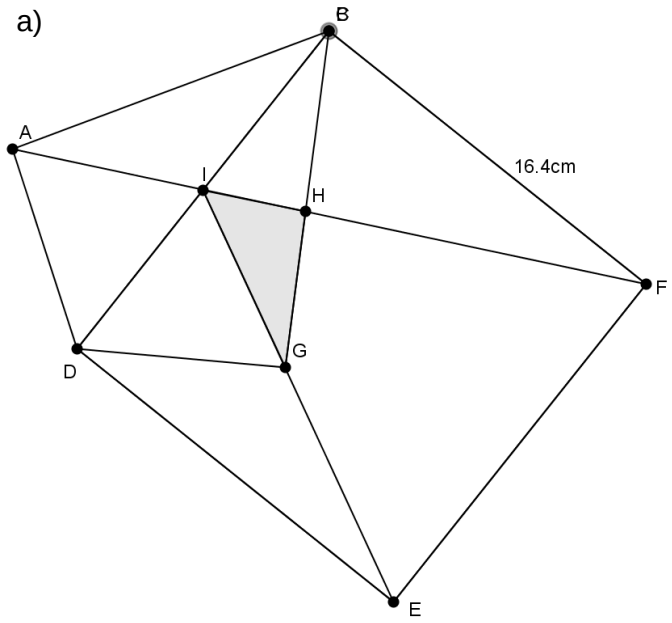
iv) Is ΔBEF similar to ΔCEH? Show all working out.

v) If a line was drawn to connect point E with point A, and a line was drawn to connect point D with point A, would the ΔAEB be congruent with ΔADB? Show all working out.

vi) Hence, what type of triangles would ΔABE and ΔABD be? Give a reason for your answer.

6. For the following questions, study the diagrams given carefully. Make sure that your answers contain the correct units of measurement if required.

a)



In the diagram on the left, BDEF is a square. BF is 16.4cm and I is the midpoint (in the middle of) BD. AI is equal to IG. GE = 10.4cm.

i) Prove that ΔDEI is congruent with ΔBFI.

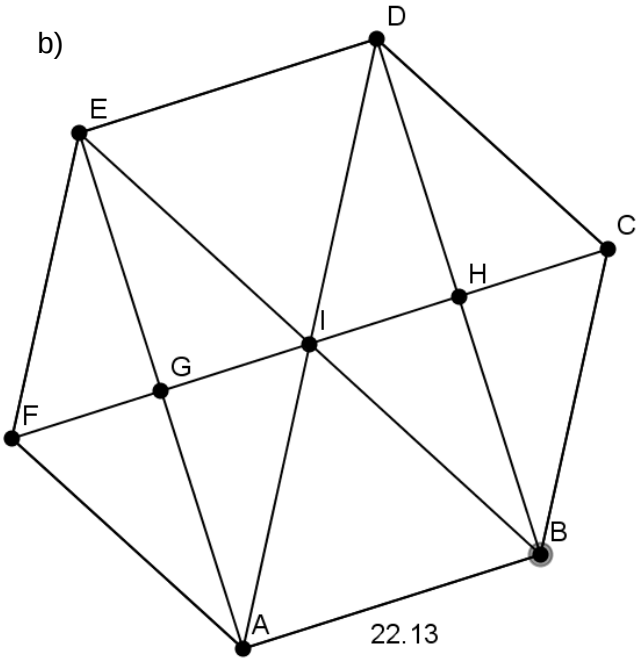
ii) Is the area of ΔEFI the same as the area of ΔDEI and ΔBFI combined? Show all working out.

iii) Prove that ΔADI is congruent with ΔDGI.

iv) Find the length of AI

v) Given that the distance of AG is 14.1cm, find the area of quadrilateral ADGI.

b)



In the diagram on the left, ABCDEF is a regular hexagon with length 22.13cm. DB ⊥ FC; DB ∥ EA and ED ∥ FC ∥ AB.

i) Prove that DC is parallel to EB.

ii) Hence, or otherwise, prove that BCDI is a rhombus and find its area.

iii) Find the area of ΔEDI. What is special about ΔEDI?

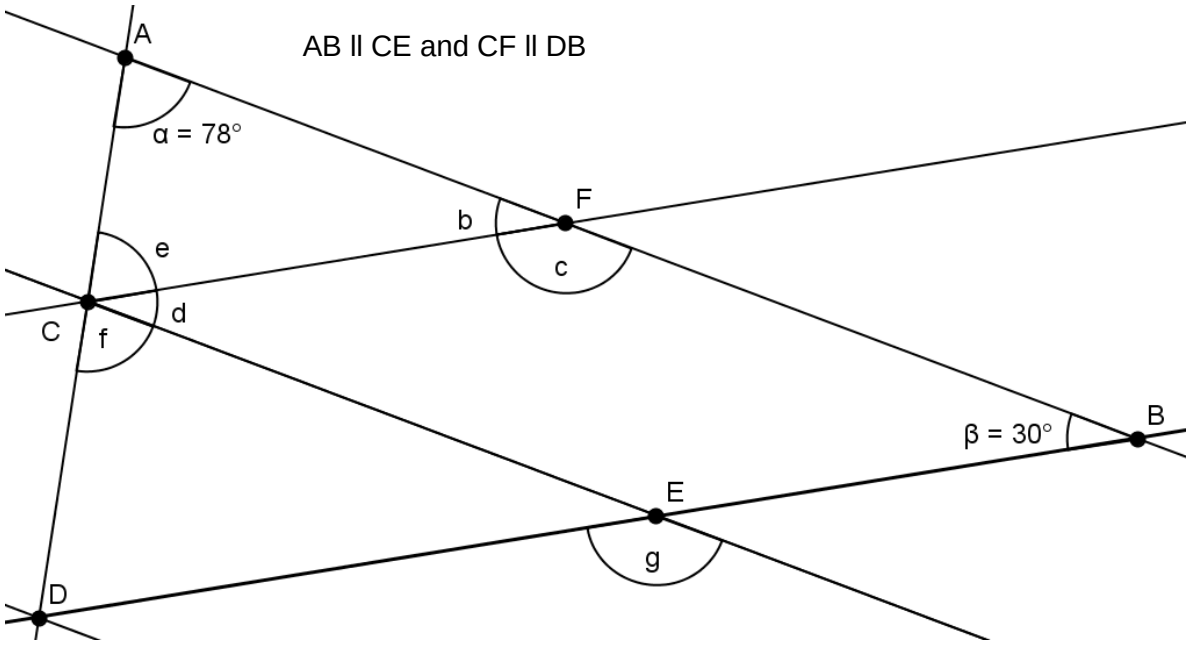
iv) Hence, or otherwise, find the area of the hexagon.

v) What is the area and perimeter of the rectangle ABDE?

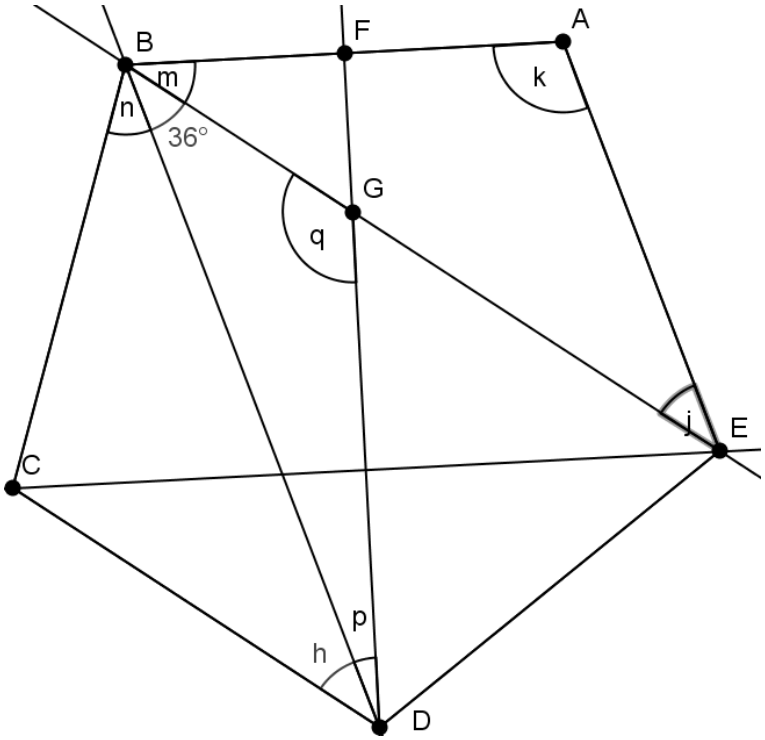
vi) If a circle was drawn the points of the hexagon with point I as the center, determine the circumference of the circle, as well as the area of the circle not covered by the hexagon.

7. For each of the diagrams given below, find the value of the given variables.

a) AB ll CE and CF ll DB



b) ABCDE is a regular pentagon; BE ll CD; FD ⊥ AB; AB ll CE and BD ll AE.



c) AB is parallel to GD. Note that F is NOT the center of the circle.