

Section A

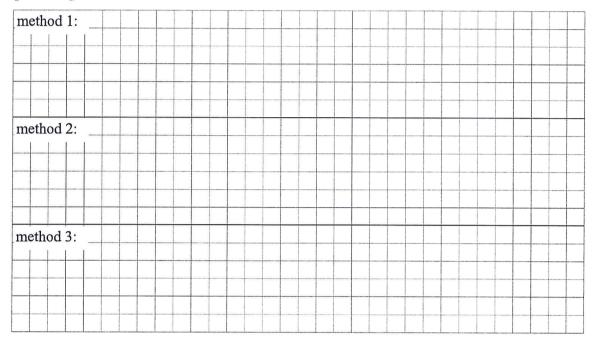
Concepts and Skills

150 marks

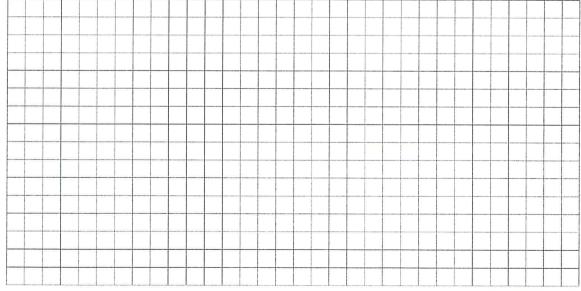
Answer all six questions from this section.

Question 1 (25 marks)

(a) Given the co-ordinates of the vertices of a quadrilateral *ABCD*, describe **three** different ways to determine, using co-ordinate geometry techniques, whether the quadrilateral is a parallelogram.



(b) Using **one** of the methods you described, determine whether the quadrilateral with vertices (-4, -2), (21, -5), (8, 7) and (-17, 10) is a parallelogram.



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Question 2

(25 marks)

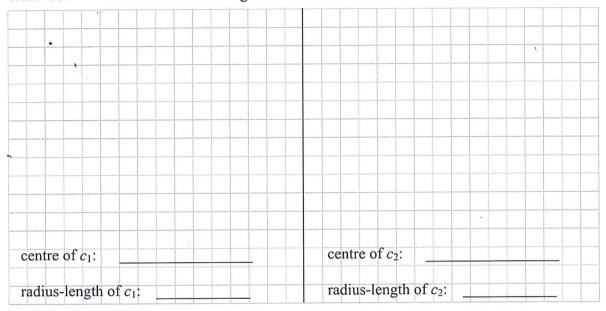
The equations of two circles are:

$$c_1: x^2 + y^2 - 6x - 10y + 29 = 0$$

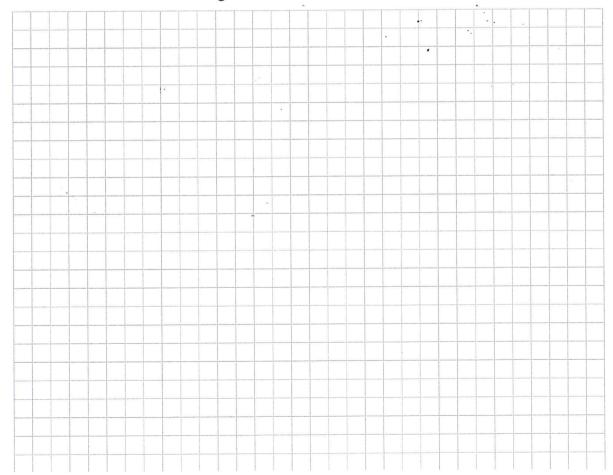
 $c_2: x^2 + y^2 - 2x - 2y - 43 = 0$

$$c_2: x^2 + y^2 - 2x - 2y - 43 = 0$$

Write down the centre and radius-length of each circle. (a)



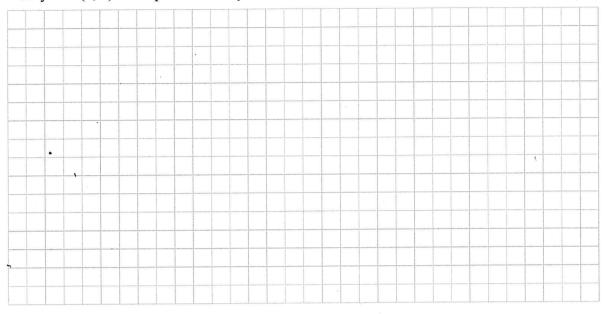
(b) Prove that the circles are touching.





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(c) Verify that (4, 7) is the point that they have in common.



(d) Find the equation of the common tangent.

