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8. In Figure 1,  $ABCD$  is a circle.  $E$  is a point lying on  $AC$  such that  $BC = CE$ . It is given that  $AB = AD$ ,  $\angle ADB = 58^\circ$  and  $\angle CBD = 25^\circ$ .

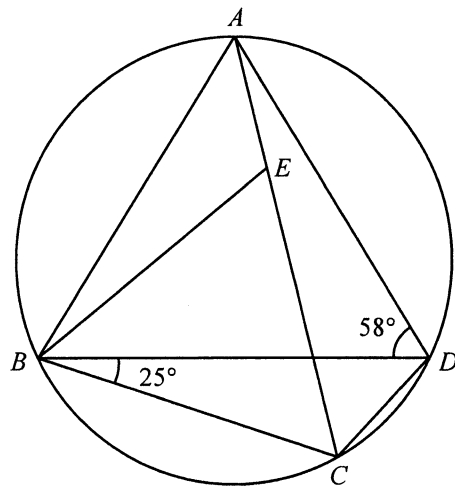


Figure 1

Find  $\angle BDC$  and  $\angle ABE$ .

(5 marks)

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9. The radius and the area of a sector are 12 cm and  $30\pi \text{ cm}^2$  respectively.

- (a) Find the angle of the sector.
- (b) Express the perimeter of the sector in terms of  $\pi$ .

(5 marks)

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12. The stem-and-leaf diagram below shows the distribution of the weights (in kg) of the students in a football club.

Stem (tens)	Leaf (units)
4	0 2 3 3 3 3 9
5	1 1 2 2 3 7 9
6	3 5 8 9
7	8 9

(a) Find the mean, the median and the range of the above distribution. (3 marks)

(b) Two more students now join the club. It is found that both the mean and the range of the distribution of the weights are increased by 1 kg. Find the weight of each of these two students. (4 marks)

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經數樂園

13. In Figure 2,  $ABCD$  is a square.  $E$  and  $F$  are points lying on  $BC$  and  $CD$  respectively such that  $AE = BF$ .  $AE$  and  $BF$  intersect at  $G$ .

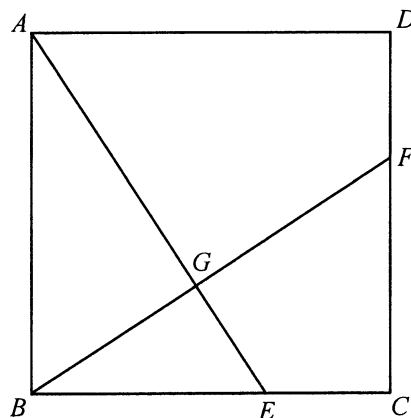


Figure 2

- (a) Prove that  $\triangle ABE \cong \triangle BCF$ . (2 marks)
- (b) Is  $\triangle BGE$  a right-angled triangle? Explain your answer. (3 marks)
- (c) If  $CF = 15$  cm and  $EG = 9$  cm, find  $BG$ . (2 marks)

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14. The coordinates of the points  $P$  and  $Q$  are  $(4, -1)$  and  $(-14, 23)$  respectively.

(a) Let  $L$  be the perpendicular bisector of  $PQ$ .

(i) Find the equation of  $L$ .

(ii) Suppose that  $G$  is a point lying on  $L$ . Denote the  $x$ -coordinate of  $G$  by  $h$ . Let  $C$  be the circle which is centred at  $G$  and passes through  $P$  and  $Q$ .

Prove that the equation of  $C$  is  $2x^2 + 2y^2 - 4hx - (3h + 59)y + 13h - 93 = 0$ .

(6 marks)

(b) The coordinates of the point  $R$  are  $(26, 43)$ . Using (a)(ii), or otherwise, find the diameter of the circle which passes through  $P$ ,  $Q$  and  $R$ .

(3 marks)

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**SECTION B (35 marks)**

15. The table below shows the means and the standard deviations of the scores of a large group of students in a Mathematics examination and a Science examination:

Examination	Mean	Standard deviation
Mathematics	66 marks	12 marks
Science	52 marks	10 marks

The standard score of David in the Mathematics examination is  $-0.5$ .

- (a) Find the score of David in the Mathematics examination. (2 marks)
- (b) Assume that the scores in each of the above examinations are normally distributed. David gets 49 marks in the Science examination. He claims that relative to other students, he performs better in the Science examination than in the Mathematics examination. Is the claim correct? Explain your answer. (2 marks)

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經數樂園

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16. A box contains 5 red bowls, 6 yellow bowls and 3 white bowls. If 4 bowls are randomly drawn from the box at the same time,

- (a) find the probability that exactly 2 red bowls are drawn; (2 marks)
- (b) find the probability that at least 2 red bowls are drawn. (2 marks)

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