

TB(3A) Ch.5 Quadrilaterals Conventional Questions

1. [16-17 Mid-year Exam #5]

In **Figure 1**, $ABCD$ is a quadrilateral. $\angle BAC = \angle ACD = 60^\circ$, $\angle B = 80^\circ$ and $AB = DC$.

(a) Prove that $ABCD$ is a parallelogram. (2 marks)

(b) Find $\angle D$. (1 mark)

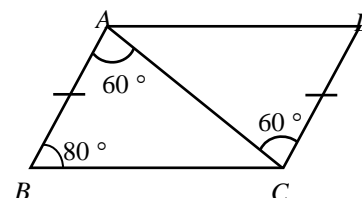


Figure 1

2. [16-17 Mid-year Exam #6]

In **Figure 2**, ABC and ADE are straight lines. It is given that $AD = DE$, $BD \parallel CE$, $AB = (x + 5)$ cm and $BC = (2x - 1)$ cm. Find x . (2 marks)

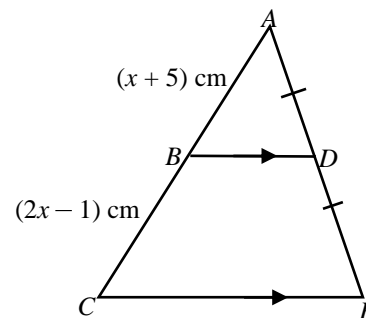


Figure 2

3. [16-17 Mid-year Exam #7]

In **Figure 3**, D and E are mid-points of AB and AC respectively.

(a) Prove that $DE \parallel BC$ and $DE = \frac{1}{2} BC$. (1 mark)

(b) (i) Prove that $\triangle BCG \sim \triangle EDG$. (2 marks)

(ii) Find $BG : EG$. (2 marks)

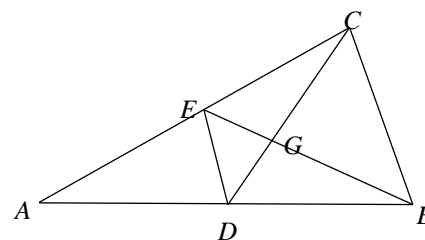


Figure 3

4. [16-17 Final Exam #14]

Figure 4 shows parallelogram $ABCD$, where $AM = MB = DQ = QC$, $BP = PC = 8$ cm and $BD \parallel MN$.

- (a) Find AN . (2 marks)
 (b) Prove that $MNQP$ is a parallelogram. (2 marks)

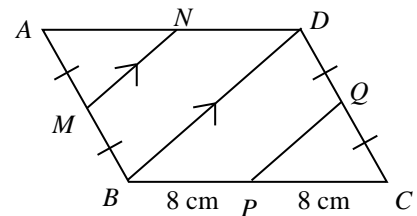


Figure 4

5. [16-17 Final Exam #15]

Figure 5 shows a quadrilateral $PQRS$, where PR and QS are perpendicular bisectors to each other.

- (a) Name the type of quadrilateral $PQRS$ belongs to. (1 mark)
 (b) (i) Express the area of the quadrilateral $PQRS$ in terms of PR and SQ . (1 mark)
 (ii) Find the percentage change in the area of the quadrilateral if PR is increased by 10% and SQ is decreased by 25%. (2 marks)

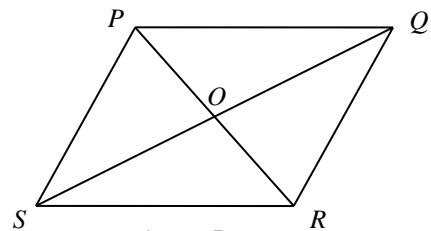


Figure 5

6. [17-18 Mid-year Exam #5]

In Figure 1, $ABCD$ is a parallelogram. Find the value of x .

(2 marks)

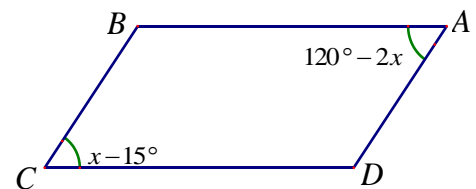


Figure 1

7. [17-18 Mid-year Exam #7]

In Figure 3, $ABCD$ is a rhombus. E and F are points on BC and AD respectively such that $\angle ABF = \angle CDE$.

- (a) Prove that $\triangle ABF \cong \triangle CDE$. (3 marks)
 (b) Show that $BFDE$ is a parallelogram. (3 marks)

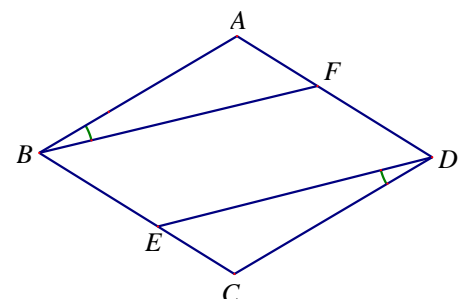


Figure 3

8. [17-18 Mid-year Exam #11]

In **Figure 6**, $ABCD$ is a parallelogram. B is the midpoint of AE . DE cuts BC at F . AF and BD cuts at G .

- (a) Prove that G is the centroid of $\triangle ADE$. (2 marks)
 (b) A student claims that the centroid of $\triangle BCD$ lies on DF .
 Do you agree? Explain your answer. (3 marks)

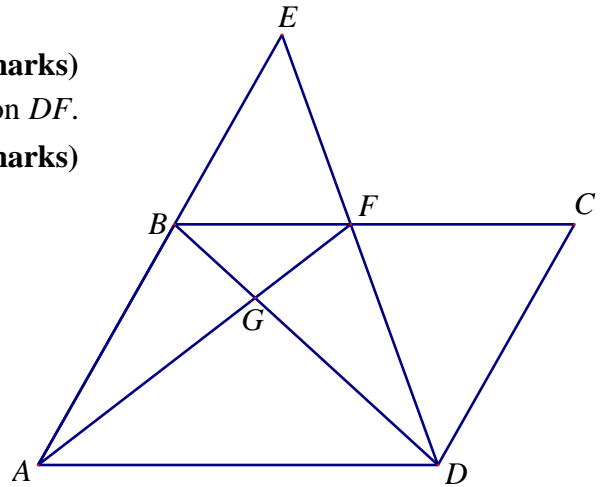


Figure 6

9. [17-18 Mid-year Exam #12]

In **Figure 7**, $ABCD$ is a rectangle while $DEFG$ is a square. AGF is a straight line. If $CD = DE = 10$ cm and $BC = 20$ cm, determine whether $ABDG$ is a trapezium. Explain your answer.

(2 marks)

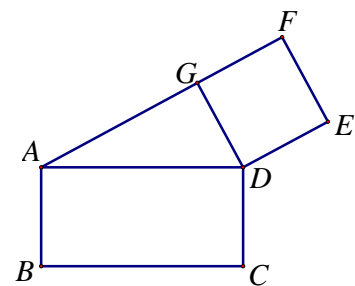


Figure 7

10. [17-18 Final Exam #6]

In **Figure 2**, ACE and BDF are straight lines. It is given that $AB \parallel CD \parallel EF$, $AC = CE$, $BD = DF$, $AB = 26$ cm and $CD = 17$ cm. Find EF .

(3 marks)

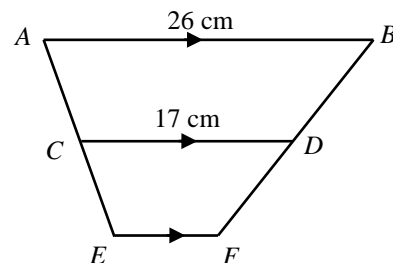
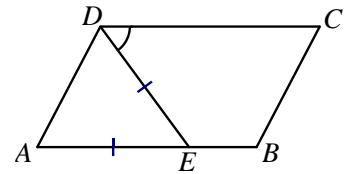


Figure 2

11. [18-19 Mid-year Exam #4]

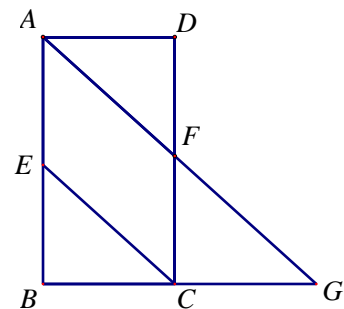
In the figure, $ABCD$ is a parallelogram. E is a point lying on AB such that $AE = DE$. If $\angle ABC = 112^\circ$, find $\angle CDE$. (3 marks)



12. [18-19 Mid-year Exam #11]

In the figure, $ABCD$ is a rectangle. BC is produced to G such that $BC = CG$. AG cuts CD at F . E is a point on AB such that $\angle AFD = \angle BEC$.

- (a) Prove that $\triangle ADF \cong \triangle CBE$. (2 marks)
- (b) Prove that E is the mid-point of AB . (3 marks)
- (c) Prove that $CEFG$ is a parallelogram. (3 marks)



13. [18-19 Final Exam #10]

In Figure 3, $ABCD$ is a parallelogram. BDE is a straight line. It is given that $AB = 3$ cm, $AF = 9$ cm, $DE = 5$ cm, $EF = 3$ cm and $\angle CDB = \angle DAB$. Prove that $ABEF$ is a parallelogram. (2 marks)

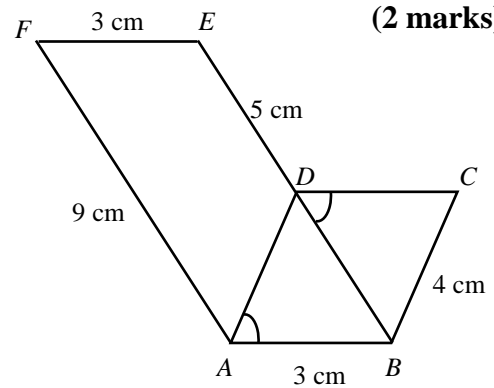


Figure 3

14. [18-19 Final Exam #12]

In **Figure 5**, it is given that $BD \parallel CG$, $AB = BC$ and $CF = FG$. BG cuts AF at E .

- (a) Prove that $\triangle BDE \sim \triangle GFE$. (2 marks)
- (b) Find $BD : CF$. (2 marks)
- (c) Hence, or otherwise, find $AE : EF$. (3 marks)

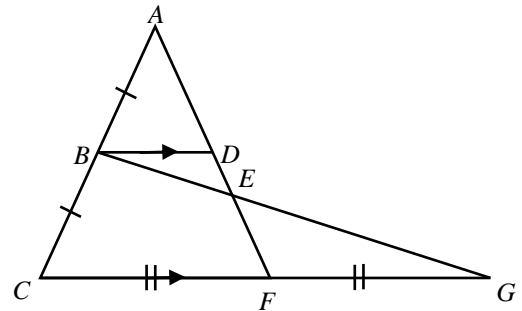


Figure 5

15. [19-20 Mid-year Exam #8]

Figure 1 shows a quadrilateral $ABCD$ with a perimeter of 30 cm. $AB = CD = 4$ cm.

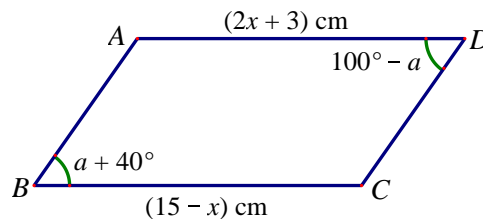


Figure 1

- (a) Prove that $ABCD$ is a parallelogram. (3 marks)
- (b) Find $\angle BCD$. (2 marks)

16. [19-20 Mid-year Exam #10]

Figure 2 shows a parallelogram $ABCD$. E and F are the mid-points of AB and BC respectively.

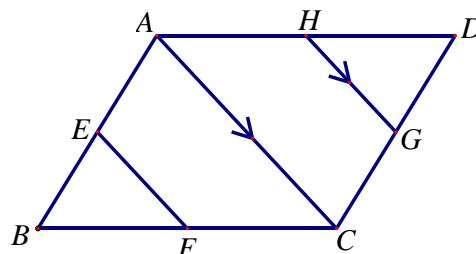


Figure 2

- (a) Prove that $EF \parallel AC$. (1 mark)
- (b) If H is the mid-point of AD , prove that $EFGH$ is a parallelogram. (3 marks)

17. [19-20 Mid-year Exam #13]

In **Figure 3**, $ABCD$ is a rectangle and $BEDF$ is a rhombus. BD meets EF at G . FB is the angle bisector of $\angle ABD$.

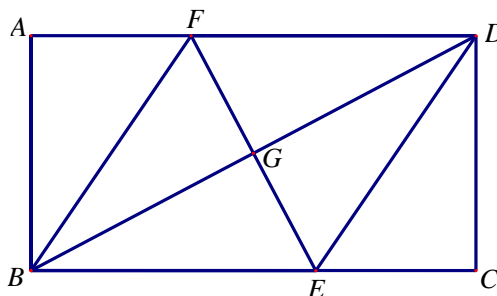
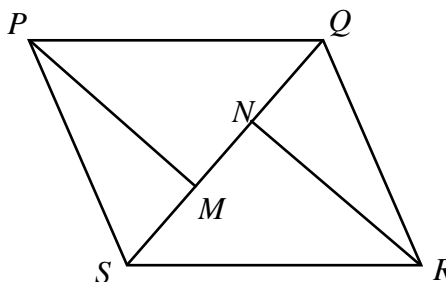


Figure 3

- (a) Prove that $\triangle ABF \cong \triangle GBE$. (3 marks)
- (b) Prove that DE is the angle bisector of $\angle BDC$. (3 marks)
- (c) A student claims that $AF : FD = 1 : 2$. Do you agree? Explain your answer. (2 marks)

18. [20-21 Mid-year Exam #8]

In **Figure 2**, $PQRS$ is a parallelogram. Points M and N lie on the diagonal SQ such that PM and RN are the altitudes of $\triangle PSQ$ and $\triangle RQS$ respectively.



Figure

- (a) Prove that
 - (i) $\triangle PSM \cong \triangle RQN$, (3 marks)
 - (ii) $PMRN$ is a parallelogram. (2 marks)
- (b) It is given that A, B are the mid points of PS and PQ respectively. AB intersects PM at C .
 - (i) Prove that $PC : CM = 1 : 1$. (2 marks)
 - (ii) If $PN = PS$, show that ratio of area of $\triangle PSQ$ to that of $\triangle CMN$ is $6 : 1$. (3 marks)

19. [20-21 Final Exam #7]

In **Figure 2**, $ABCD$ is a rectangle. The diagonals AC and BD intersect at O . $\triangle ODE$ is an equilateral triangle. If $\angle BDA = 32^\circ$, find $\angle OEA$.
(3 marks)

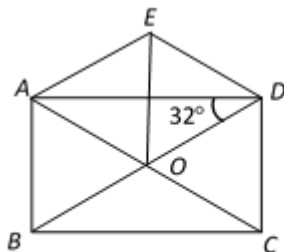


Figure 2

20. [20-21 Final Exam #13]

In **Figure 6**, M is a point on BC such that AM is the median of $\triangle ABC$. D is a point on AM and AM is produced to a point E such that $\angle DBC = \angle ECB$. Prove that $BECD$ is a parallelogram.
(3 marks)

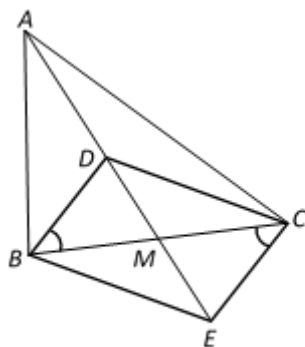


Figure 6

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