TB(3A) Ch. 4 Quadrilaterals

Conventional Questions

1. **[13-14 Mid-year Exam Q4]**
   In **Figure 2**, *D*, *E* and *F* are points on *AB*, *BC* and *CA* respectively such that *ADEF* is a parallelogram. *D* is the mid-point of *AB*.
   (a) Show that *E* and *F* are the mid-points of *BC* and *CA* respectively. **(2 marks)**
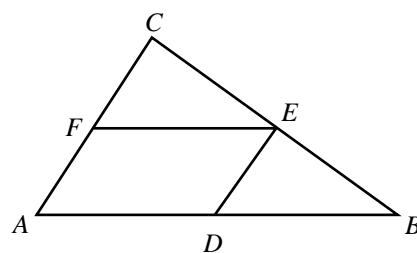   **(b)** If *ED* = 4 cm, find *CF*. **(2 marks)**

   Figure 2

2. **[13-14 Mid-year Exam Q7]**
   In **Figure 3**, *ABCD* is a parallelogram. *E* and *F* are points on *AB* and *CD* respectively such that *BE = BC* and   *DF = AD*.
   (a) If $\angle AFD = 50°$, find $\angle B$. **(2 marks)**
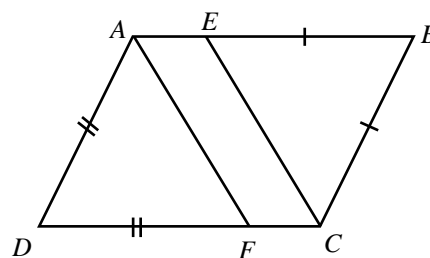   **(b)** Prove that *AECF* is a parallelogram. **(3 marks)**

   Figure 3

3. **[13-14 Mid-year Exam Q11]**
   In **Figure 5**, *ABCD* is a square. *BFDE* is a straight line.
   (a) Prove that $\triangle ACE$ is an isosceles triangle. **(3 marks)**
   (b) If *BD = DE* and the area of square *ABCD* is 2 cm^2, find *AE*. **(3 marks)**
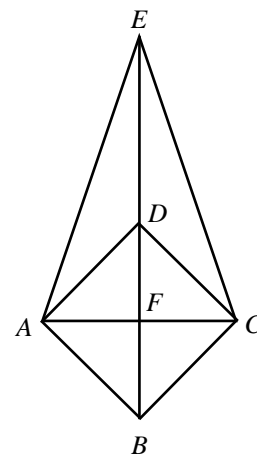
   Figure 5

4. **[13-14 Final Exam Q3]**
   In **Figure 1**, *ABCD* is a parallelogram and *BCE* is a straight line.   *AD = AC* and $\angle B = 70°$.
   (a) Find $\angle CAD$. **(3 marks)**
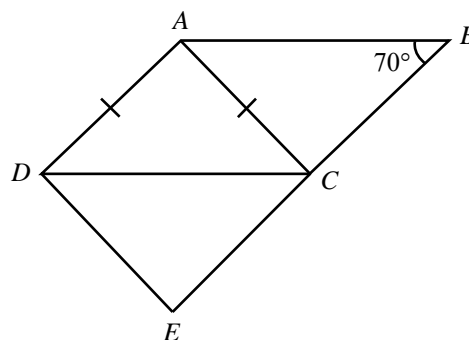   **(b)** If $\triangle ACB \cong \triangle DEC$, prove that *ACED* is a parallelogram. **(2 marks)**

   Figure 1

5. **[13-14 Final Exam #14]**

In **Figure 8**, *ABCD* is a rectangle and *GH* is an altitude of ΔGFE.   *A* and *B* are the mid-points of *GE* and *GF* respectively.   If the area of ΔGFE is 24 cm^2, find the area of rectangle *ABCD*.
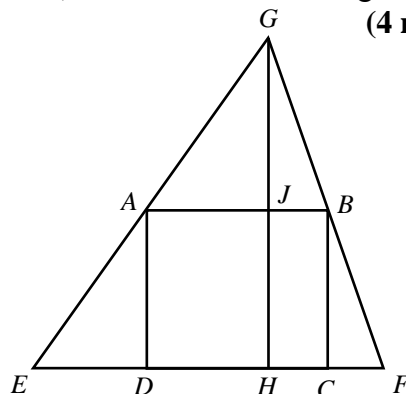
(4 marks)

Figure 8

6. **[13-14 S.6 Mock Exam #7]**

In **Figure 1**, *AGB*, *AFC*, *GFD* and *AED* are straight lines. *GD // BC*, *AE = ED* and *AG = GB*.

GF = 6 cm and the area of ΔACD is 100 cm^2. Find

(a)   *BC*,   **(1 mark)**

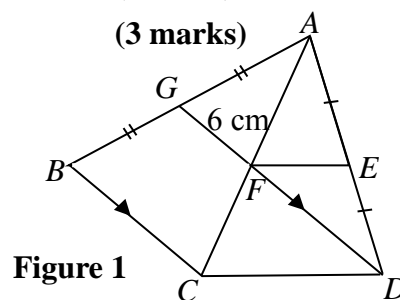(b)   the area of ΔAFE.   **(3 marks)**

Figure 1

7. **[14-15 Mid-year Exam #7]**

In **Figure 3**, *EBFD* is a rectangle. *A* and *C* are points on *EB* and *DF* respectively such that $\angle BAD = 2x - 20°$, $\angle BCD = x + 50°$ and $\angle ADC = 60°$.
(a)   Find the value of *x*.   **(2 marks)**
(b)   Prove that *ABCD* is a parallelogram.   **(3 marks)**
(c)   Prove that $\Delta AED \cong \Delta CFB$.   **(2 marks)**
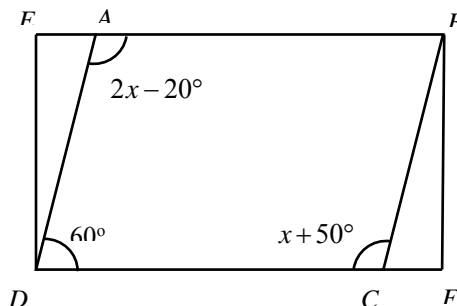
Figure 3

8. **[14-15 Mid-year Exam #8]**

In **Figure 4**, *ADB*, *AEC* and *BEF* are straight lines. *AD = DB, DE // BC*, $\angle DEB = \angle BFC$ and   *DE* = 5 cm.
(a)   Find *BC*.   **(2 marks)**
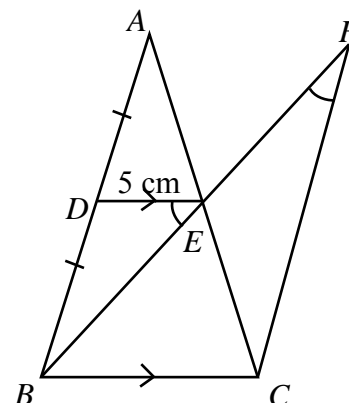(b)   Find *CF*.   **(2 marks)**

Figure 4

9.   **[14-15 Mid-year Exam #13]**

   In **Figure 5**, *ABCD* is a rhombus and *CDEF* is an isosceles trapezium. $DE = 2CF$ and $\angle BCF = 90°$. If the perimeters of *ABCD* and *CDEF* are the same, find $\angle CBF$. **(3 marks)**
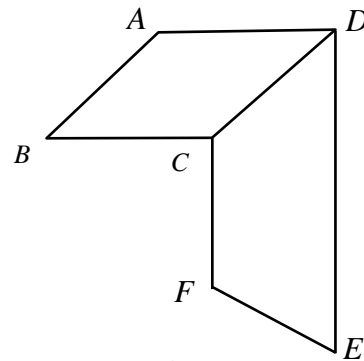
Figure 5

10. **[14-15 Final Exam #7]**

   In **Figure 3**, *ABCD* is a rhombus. The diagonals *AC* and *BD* intersect at *F*. It is given that *E* is the mid-point of *AD*, *DF* = 6 cm and *CF* = 8 cm.
   (a)   Find *CD*.   **(2 marks)**
   (b)   Find *EF*.   **(2 marks)**
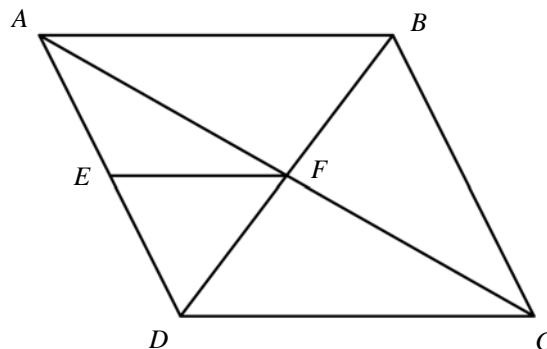
Figure 3

11. **[14-15 Final Exam #15]**

   In **Figure 8(a)**, *ABCD* is a parallelogram. *E*, *F*, *G* and *H* are points on *DA*, *AB*, *BC* and *CD* respectively. It is given that $\triangle AFE \cong \triangle CHG$.
   (a) By considering $\triangle EDH$ and $\triangle GBF$, prove that *EFGH* is a parallelogram.   **(4 marks)**
   (b) In **Figure 8(b)**, *AC* meets *EF* and *HG* at points *M* and *N* respectively. *AC*, *BD*, *FH* and *EG* meet at *O*. Prove that *MFNH* is a parallelogram.   **(2 marks)**
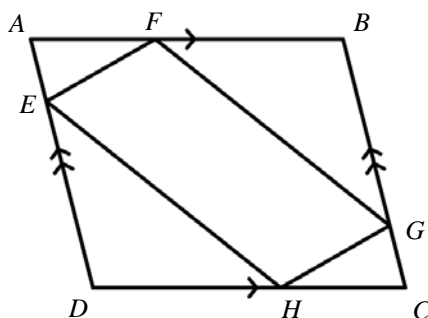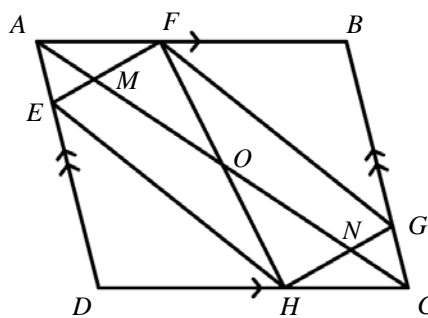
Figure 8(a)   **Figure 8(b)**

12. **[15-16 Mid-year Exam #2]**

   In **Figure 1**, *ABCD* is a rhombus. *AC* and *BD* intersect at *E*. It is given that *AE* = 2*x* cm and *BE* = *x* cm. If the perimeter is 80 cm, find the value of *x*.   **(3 marks)**
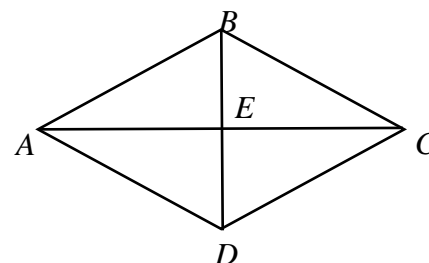
Figure 1

13. [15-16 Mid-year Exam #5]

In **Figure 2**, C is the mid-point of AD and $BC \parallel ED$. If $BC = (2x - 2)$ cm and $ED = (3x + 5)$ cm, find the value of x.   **(2 marks)**
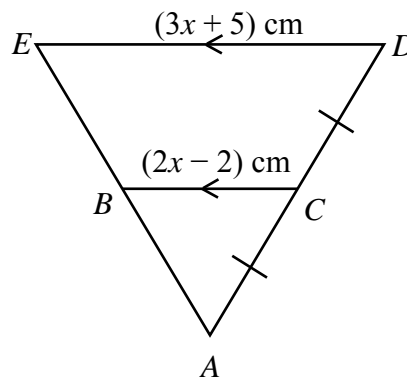

Figure 2

14. [15-16 Mid-year Exam #6]

In **Figure 3**, $ABCD$ is a square. AE and BD intersect at G. DC and AE extend to meet at F. It is given that EC is the median of $\triangle DEF$ and $\angle F = 30°$.

(a) Prove $\triangle CDE \cong \triangle CFE$.   **(2 marks)**
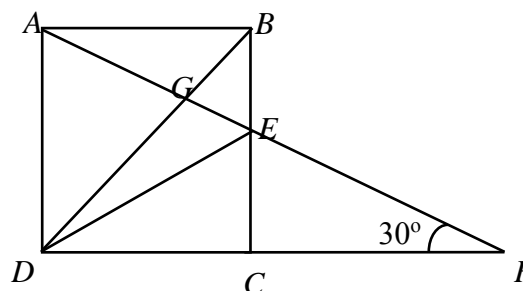**(b)** Find $\angle GDE$.   **(2 marks)**

Figure 3

15. [15-16 Mid-year Exam #10]

In **Figure 6**, $ABCD$ is a parallelogram. It is given that $BF \perp AC$ and $DE \perp AC$. Prove that $BEDF$ is a parallelogram.   **(4 marks)**
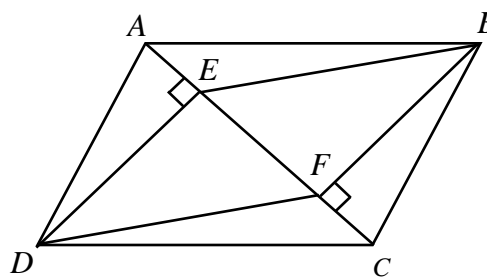

Figure 6

16. [15-16 Mid-year Exam #12]

In **Figure 7**, $ABCD$ is a rhombus and its diagonals AC and BD intersect at M. O is the incentre of $\triangle ABC$. EOC is a straight line. Prove that $\angle BEC = 3\angle BCE$.   **(3 marks)**
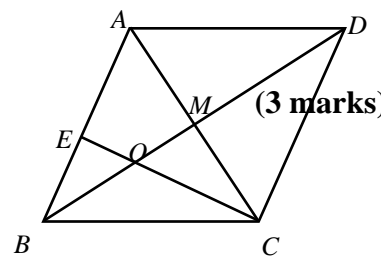

Figure 7

17.   [15-16 Final Exam #11]

In **Figure 5**, *BEFD* is a parallelogram. *D, E* and *F* are the points on *AB*, *BC* and *AC* respectively, such that *FD* bisects *AB*. Prove that *BE = CE*.   **(3 marks)**
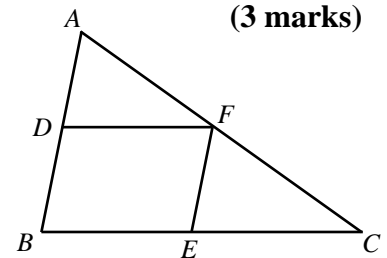

Figure 5

18.   [15-16 Final Exam #14]

In **Figure 7**, *ABCD* is a square and *CDEF* is a rhombus. *BDE* is a straight line. *CD* and *BF* intersect at *M*. Prove that *FB* is an angle bisector of ∠*EBC*.   **(3 marks)**
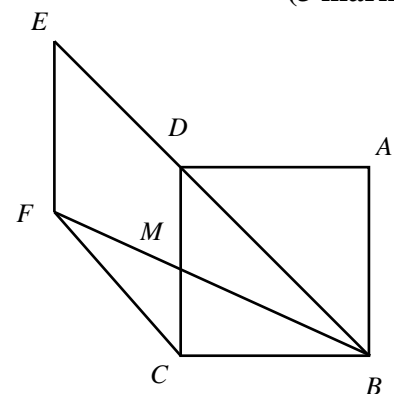

Figure 7

19.   [15-16 Final Exam #19]

In **Figure 11**, *AR* and *BS* are the medians of Δ*ABC* and intersect at *M*. *PS* and *PQ* are the medians of Δ*ASM* and Δ*BPM* respectively. Prove that *PQRS* is a parallelogram.   **(3 marks)**
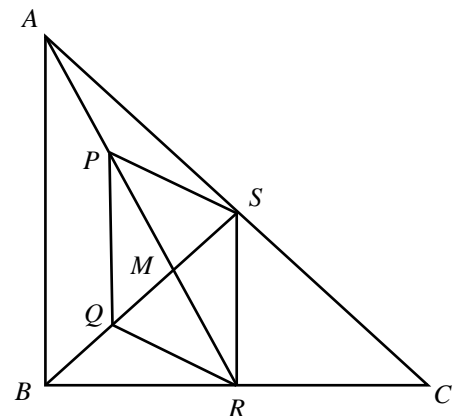

Figure 11

20. [16-17 Mid-year Exam #5]

In **Figure 1**, $ABCD$ is a quadrilateral. $\angle BAC = \angle ACD = 60°$, $\angle B = 80°$ and $AB = DC$.
(a) Prove that $ABCD$ is a parallelogram. **(2 marks)**
(b) Find $\angle D$. **(1 mark)**

Figure 1

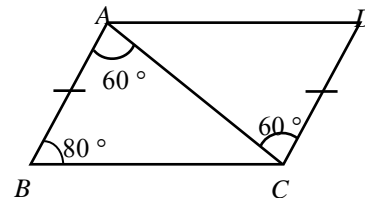**21. [16-17 Mid-year Exam #6]**

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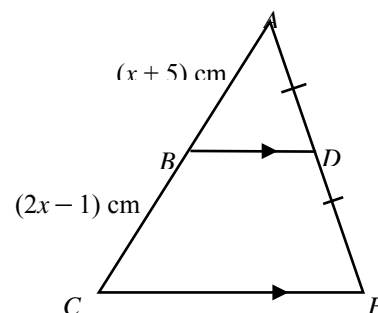**(2 marks)**

Figure 2

22. [16-17 Mid-year Exam #7]

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

(a) Prove that $DE \,/\!/\, BC$ and $DE = \dfrac{1}{2} BC$. **(1 mark)**

(b) (i) Prove that $\triangle BCG \sim \triangle EDG$. **(2 marks)**
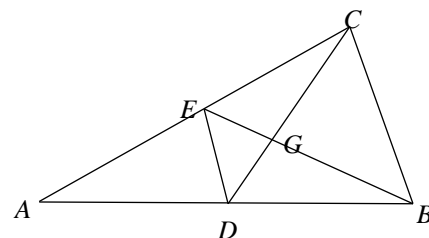 **(ii)** Find $BG : EG$. **(2 marks)**

Figure 3

23. [16-17 Final Exam #14]

Figure 4 shows parallelogram $ABCD$, where $AM = MB = DQ = QC$, $BP = PC = 8$ cm and $BD \,/\!/\, MN$.
(a) Find AN. **(2 marks)**
(b) Prove that $MNQP$ is a parallelogram. **(2 marks)**
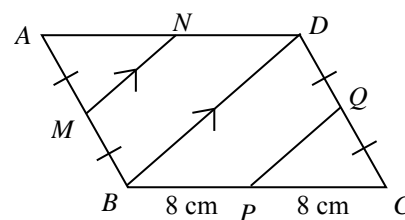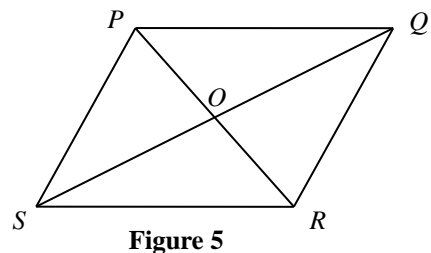

Figure 4

24. [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

25. [17-18 Mid-year Exam #5]

In **Figure 1**, *ABCD* is a parallelogram. Find the value of *x*.   **(2 marks)**
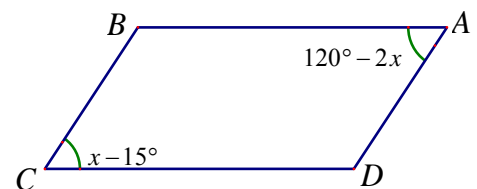
$120° - 2x$

$x - 15°$

Figure 1

26. [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)**
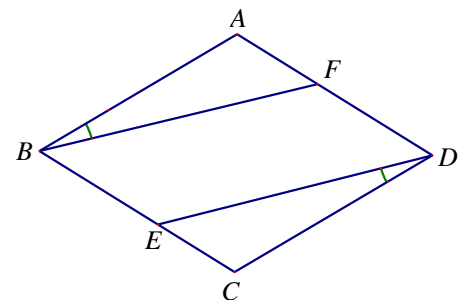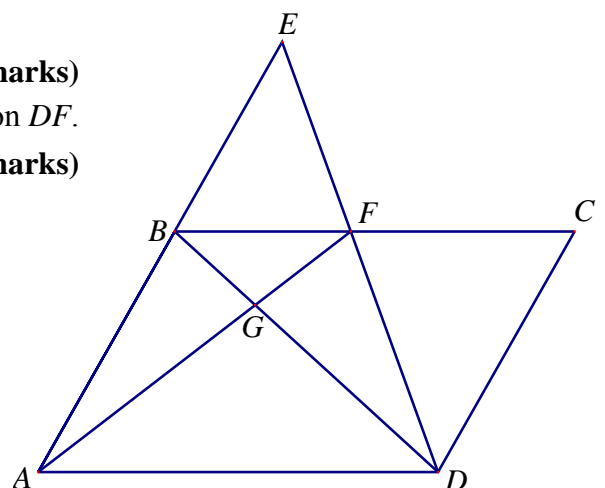
(b) Show that *BFDE* is a parallelogram.   **(3 marks)**

Figure 3

27. [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

28. [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)**
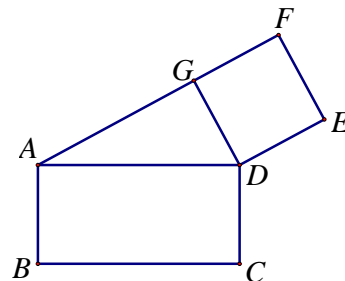
Figure 7

29.   [17-18 Final Exam #6]

In **Figure 2**, *ACE* and *BDF* are straight lines. It is given that *AB* // *CD* // *EF*, $AC = CE$, $BD = DF$, $AB = 26$ cm and $CD = 17$ cm. Find *EF*.   **(3 marks)**
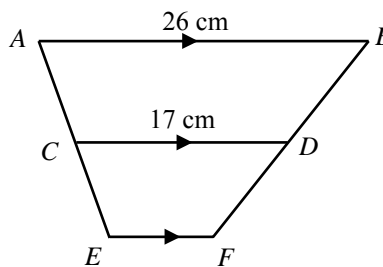
Figure 2

~ End ~