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MATHS

BOOKS - ICSE

SPECIAL TYPES OF QUADRILATERALS

Example

1. Prove that consecutive angles ofa parallelogram are supplementary.

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2. In a parallelogram ABCD, X and Y are points on diagonal BD such that DX=BY. Prove that AXCY is a parallelogram.

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3. P and Q are the points of trisection of the diagonal BD of a parallelogram ABCD. Prove that CQ is parallel to AP.

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4. In parallelogram ABCD, the bisectors of adjacent angles A and D intersect each other at point P. prove that $\angle APD = 90^\circ$.

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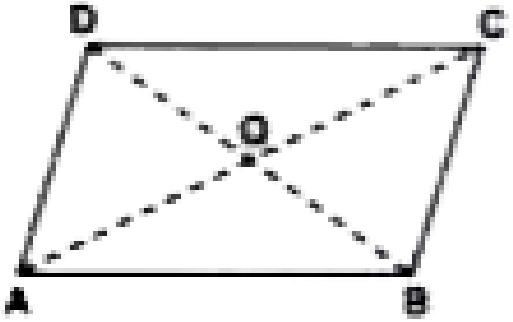

5.

The given figure shows a parallelogram ABCD

whose diagonals intersect each other at point O. if OB=6 cm and AC is 6 cm more than BD, find OC.

A. $12cm$

B. $10cm$

C. $9cm$

D. $11cm$

Answer: C

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6. The adjacent sides of a parallelogram are in the ratio $5:3$. if its perimeter is $96cm$, find the sides of the parallelogram.

A. $30cm$ and $18cm$.

B. $55cm$ and $18cm$.

C. $26cm$ and $10cm$.

D. $37cm$ and $28cm$.

Answer: A

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7. One of the diagonals of a rhombus is equal to its sides. Find the angles of the rhombus.

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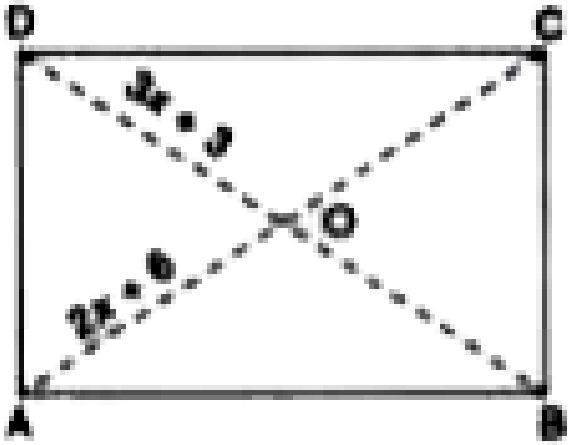

8.

In the given figure, the diagonals AC and BD of a rectangle ABCD intersect each other at point

O.

If OA=2x+6 and OD=3x+3, find the value of x.

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Exercise

1. In parallelogram ABCD, $\angle A = 3cm$ times $\angle B$. Find all the angles of the parallelogram. In the same parallelogram, if AB=5x-7 and CD=3x+1, find the length of CD.

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2. In parallelogram PQRS, $\angle Q = (4x - 5)^\circ$ and $\angle S = (3x + 10)^\circ$.

Calculate: $\angle Q$ and $\angle R$.

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3. In rhombus ABCD:

(i) if $\angle A = 74^\circ$, find $\angle B$ and $\angle C$.

(ii) if $AD = 7 \cdot 5cm$, find BC and CD.

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4. In square PQRS:

(i) if $PQ = 3x - 7$ and $QR = x + 3$, find PS.

(ii) if PR=5x and QS=9x-8. find QS.

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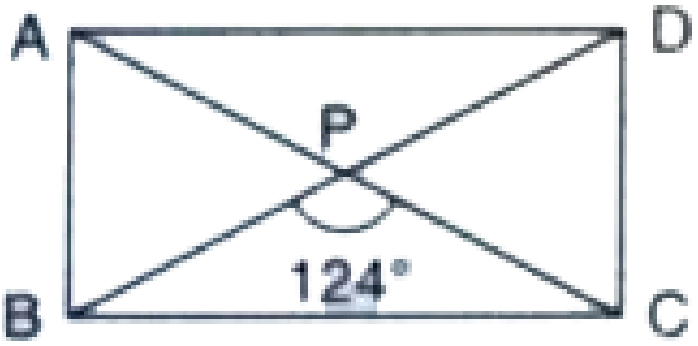

5.

ABCD is a rectangle.

If $\angle BPC = 124^\circ$.

Calculate:

(i) $\angle BAP$

(ii) $\angle ADP$.

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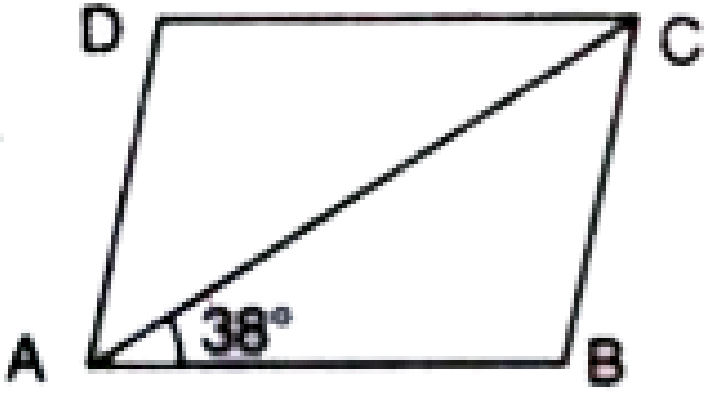

6.

ABCD is a rhombus. If $\angle BAC = 38^\circ$, find:

(i) $\angle ACB$

(ii) $\angle DAC$

(iii) $\angle ADC.$

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7. ABCD is a rhombus. If $\angle BCA = 35^\circ,$ and $\angle ADC.$

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8. PQRS is a parallelogram whose diagonals intersect at M.

if

$\angle PMS = 54^\circ, \angle QSR = 25^\circ$ and $\angle SQR = 30^\circ$

, find:

(i) $\angle RPS$

(ii) $\angle PRS$

(iii) $\angle PSR.$

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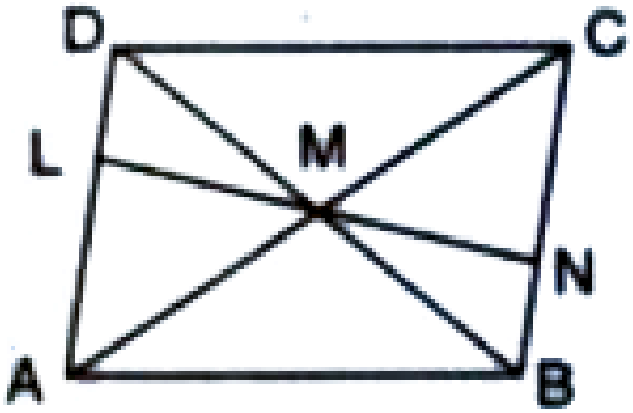

9. .

Given: Parallelogram

ABCD in which diagonals AC and CD intersect

at M.

Prove: M is mid-point of LN.

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10. In an isosceles-trapezium, show that the opposite angles are supplementary.

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11. ABCD is a parallelogram. What kind of quadrilateral is it if:

(i) AC=CD and AC is perpendicular to BD?

(ii) AC is perpendicular to BD but is not equal to it ?

(iii) AC=BD but AC is not perpendicular to BD ?

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12. Prove that the diagonals of a parallelogram bisect each other.

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13. If the diagonals of a parallelogram are of equal lengths, the parallelogram is a rectangle. Prove it.

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14. In parallelogram ABCD, E is the mid-point of AD and F is the mid-point of BC. Prove that BFDE is a parallelogram.

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15. In parallelogram ABCD, E is the mid-point of side AB and CE bisect angle BCD. Prove that :

(i) AE=AD

(ii) DE bisect $\angle ADC$ and

(iii) Angle DEC is a right angle.

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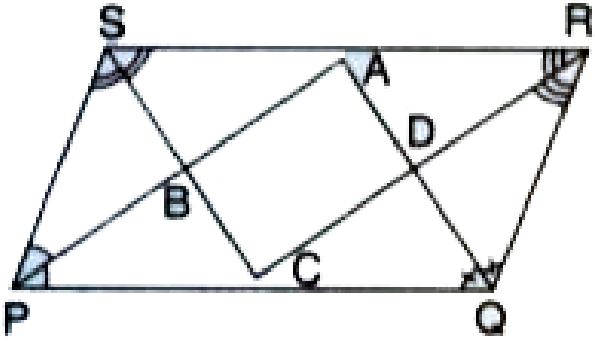
16.



In the alongside diagram, the bisectors of interior angles of the parallelogram PQRS enclose a quadrilateral ABCD.

Show that:

(i) $\angle PSB + \angle SPB = 90^\circ$

(ii) $\angle PBS = 90^\circ$

(iii) $\angle ABC = 90^\circ$

(iv) $\angle ADC = 90^\circ$

(v) $\angle A = 90^\circ$

(vi) ABCD is a rectangle

thus, the bisectors of the angles of a parallelogram enclose a rectangle.

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17. In parallelogram ABCD, X and Y are mid-points of opposite sides AB and DC respectively. Prove that:

(i) AX=YC.

(ii) AX is parallel to YC

(iii) AXCY is a parallelogram.

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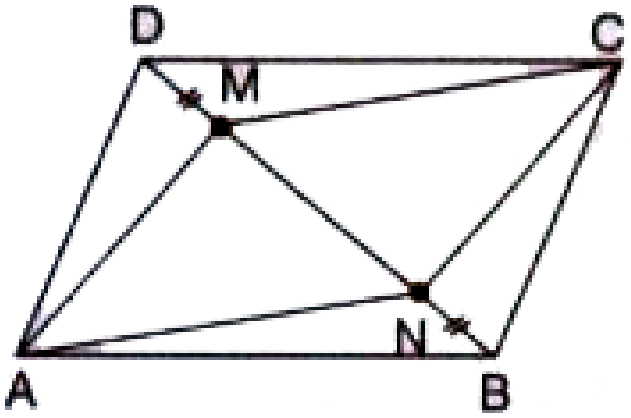
18. The given figure shows parallelogram ABCD. Points M and N lie in diagonal BD such that DM=BN



Prove that:

(i) $\Delta DMC \cong \Delta BNA$ and so CM=AN.

(ii) $\Delta AMD \cong \Delta CNB$ and so $AM = CN$.

(iii) ANCM is a parallelogram.

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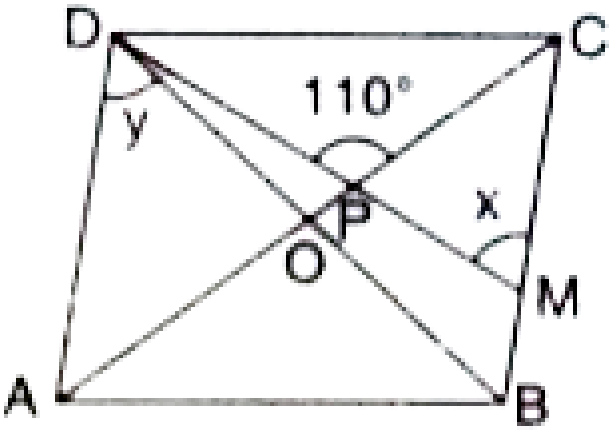

19.

The given figure shows a rhombus ABCD in

which angle $BCD = 80^\circ$. Find angles x and y.

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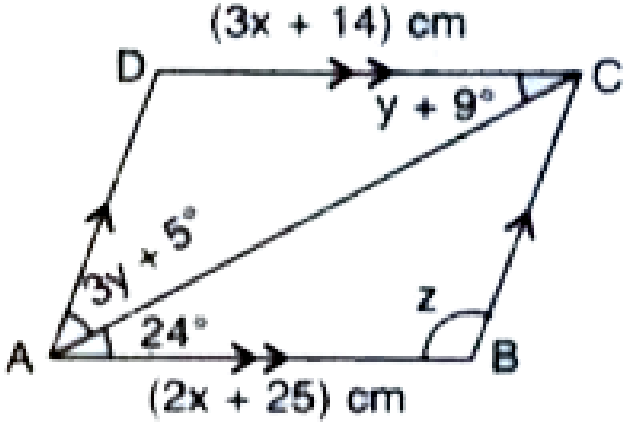
20. Use the information given in the following diagram to find the values of x, y and z.



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21. The following figure is a rectangle in which $x:y=3:7$, find the values of x and y.

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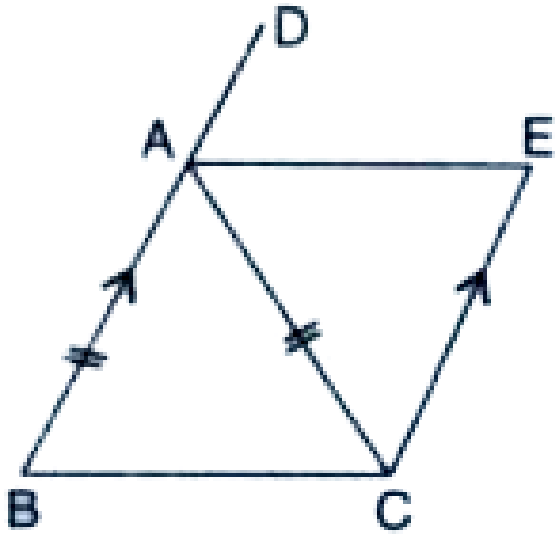
22. In the given figure, $AB \parallel EC$, $AB = AC$ and AE bisects $\angle DAC$. Prove that:

(i) $\angle EAC = \angle ACB$

(ii) ABCE is a parallelogram.



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