



MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

QUADRILATERALS

Others

1. The sides AB and CD of a parallelogram ABCD are

bisected at EandF . Prove that EBFD is a

parallelogram.

2. In Figure, ABCD is a trapezium in which ABllCD and

AD=BC show that : ot A=ot B (ii) ot C=ot D (iii) A B

C~= B A D(iv)DiagonalA C=diagnol B D

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3. If the diagonals of a parallelogram are perpendicular,

then it is a rhombus.

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4. Show that the diagonals of a rhombus are perpendicular to each other

5. If the diagonals of a parallelogram are equal and intersect at right angles, then the parallelogram is a square.

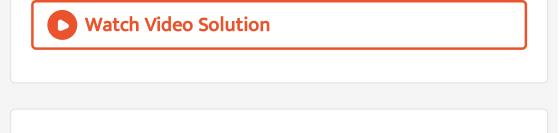


6. Show that the diagonals of a square are equal and bisect each other at right angles.



7. The diagonals of a rectangle ABCD meet at O_{\cdot} If

 $\angle BOC = 44^0, \text{ find } \angle OAD_{\cdot}$



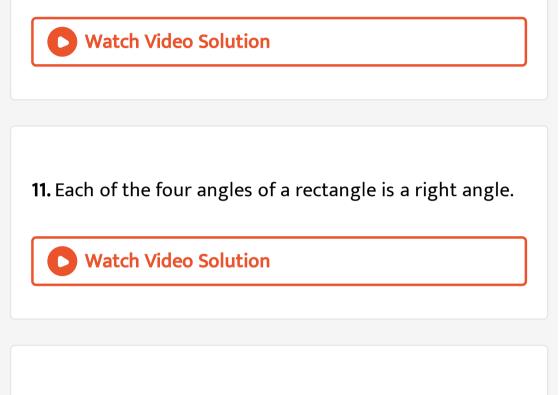
8. PQRS is a square. PR and SQ intersect at O. State

the measure of $\angle POQ$.



9. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that: (i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D$.

10. ABCD is a rhombus with $\angle ABC = 56^{0}$. Determine $\angle ACD$.



12. Each of the four sides of a rhombus is of the same length.

13. AB, CD are two parallel lines and a transversal l intersects AB at X and CD at Y Prove that the bisectors of the interior angles form a parallelogram, with all its angles right angles i.e., it is a rectangle.

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14. If ABC and DEF are two triangles such that AB, BC are respectively equal and parallel to DE, EF, then show that (i) quad ABED is a parallelogram (ii) quad BCFE is a paralellogram (iii) AC=DF (iv) $\Delta ABC \cong \Delta DEF$

15. In Figure, ABCD is a parallelogram and X and Y are points on the diagonal BD such that DX = BY. Prove that AXCY is a parallelogram (ii) AX = CY, AY = CX (iii) $AYB \cong CXD$ (iv) $AXD \cong CYB$

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16. In Figure, ABC is an isosceles triangle in which AB = AC and $CP \mid AB$ and AP is the bisector of exterior $\angle CAD$ of ABC. Prove that $\angle PAC = \angle BCA$ and (ii) ABCP is a parallelogram.

17. In Figure, X, Y are the mid-points of opposite sides AB and DC of a parallelogram $ABCD\dot{A}Y$ and DX are joined intersecting in P; CX and BY are joined intersecting in Q. Show that DXBY is a parallelogram, PXQY is parallelogram.



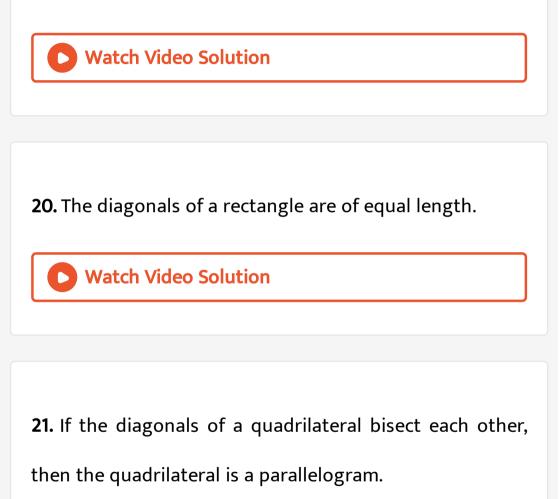
18. Two segments AC and BD bisect each other at O .

Prove that ABCD is a parallelogram.



19. Each of the angles of a square is a right angle and

each of the four sides is of the same length.



22. A quadrilateral is parallelogram if its opposite angles

are equal.

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23. A quadrilateral is a parallelogram if its opposite sides

are equal.

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24. In Figure, ABCD is a parallelogram in which $\angle A = 60^0$. If the bisectors of $\angle A$ and $\angle B$ meet at P, prove that AD = DP, PC = BC and DC = 2AD. Figure





25. Show that if the diagonals of a quadrilateral are equal

and bisect each other at right angle, then it is a square.

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26. Show that the diagonals of a square are equal and bisect each other at right angles.

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27. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.



28. A quadrilateral is a parallelogram, if its one pair of

opposite sides are equal and parallel.

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29. In Figure, ABCD is a parallelogram and X, Y are the

mid=points of sides AB and DC respectively. Show that

AXCY is a parallelogram. Figure

30. In a triangle ABC median AD is produced to X such

that AD = DX. Prove that ABXC is a parallelogram.



31. In Figure, PQRS is a parallelogram, PO and QO are, respectively, the angle bisectors of $\angle P$ and $\angle Q$. Line LOM is drawn parallel to PQ. Prove that : PL = QM (ii) LO = OM



32. The diagonals of a parallelogram ABCD intersect at

OA line through O intersects AB at X and DC at Y.



33. ABCD is a parallelogram and $\angle DAB = 60^{\circ}$. If the bisectors AP and BP of angles A and B respectively, meet at P on CD, prove that P is the mid-point of CD.

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34. In a parallelogram ABCD, the bisector of $\angle A$ also

bisects BC at X_{\cdot} prove that $AD=2AB_{\cdot}$

35. ABCD is a parallelogram. L and M are points on AB and DC respectively and AL = CM. prove that LM and BD bisect each other.

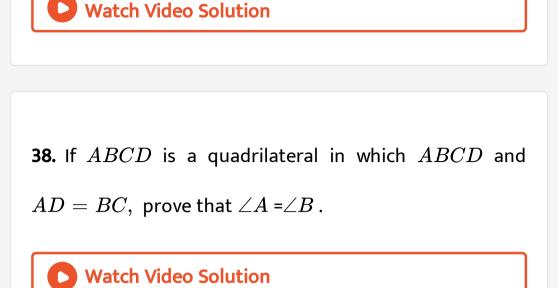


36. PQRS is a parallelogram. PX and QY are respectively, the perpendiculars from P and Q to SR and RS produced. Prove that PX = QY.

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37. ABCD is a parallelogram. AB is produced to E so that BE = AB. Prove that ED bisects BC.





39. Find the measure of all the angles of a parallelogram,

if one angle is 24^0 less than twice the smallest angle.



40. The perimeter of a parallelogram is 22cm. If the longer side measures 6. 5cm, what is the measure of the



41. In Figure, ABCD is a parallelogram in which P is the mid-point of DC and Q is a point on AC such that $CQ = \frac{1}{4}AC$. If PQ produced meets BC at R. Prove that R is a mid-point of BC.

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42. ABC is a triangle. D is a point on AB such that $AD = \frac{1}{4}AB$ and E is a point on AC such that $AE = \frac{1}{4}AC$. Prove that $DE = \frac{1}{4}BC$.



43. Show that the line segments joining the mid-points of

the opposite sides of a quadrilateral bisect each other

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44. BM and CN are perpendiculars to a line passing through the vertex A of a triangle ABC. If L is the midpoint of BC, prove that LM = LN.



45. In Figure, AN and CP are perpendicular to the diagonal BD of a parallelogram ABCD. Prove that : $ADN \cong CBP$ (ii) AN = CP

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46. Given ABC, lines are drawn through A, B and C parallel respectively to the sides BC, CA and AB, forming triangle P Q R. Show that BC=1/2QR.



47. In a parallelogram $ABCD, \angle D = 115^0$, determine

the measure of $\angle A$ and $\angle B$.

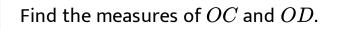


49. ABCD is a parallelogram and line segments AX, CY

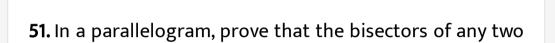
bisect the angles A and C, Show that $AX \amalg CY$.



50. In a parallelogram ABCD diagonals AC and BDintersect at O and AC = 6.8cm and BD = 13.6cm.



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consecutive angles intersect at right angle.

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52. The diagonals of a parallelogram bisect each other.



53. The angle bisectors of a parallelogram form a rectangle.



54. If diagonal of a parallelogram bisects one of the angles of the parallelogram, it also bisects the second angle.

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55. Show that the quadrilateral, formed by joining the mid-points of the sides of a square, is also a square.

56. The diagonals of a quadrilateral *ABCD* are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle.



57. ABCD is a rhombus and P, Q, R, S are the mid-points of AB, BC, CD, DA respectively. Prove that PQRS is a rectangle.

58. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.

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59. Prove that the figure formed by joining the mid-points of the pair of consecutive sides of a quadrilateral is a parallelogram. OR ABCD is a parallelogram in which P, Q, R and S are mid-points of the sides AB, BC, CDand DA respectively. AC is a diagonal. Show that : $PQ \mid |AC$ and $PQ = \frac{1}{2}AC$ $SR \mid |AC$ and $SR = \frac{1}{2}ACPQ = SR$ (iv) PQRS is a parallelogram. **60.** In Figure, AD is the median and $DE \mid AB$. Prove that BE is the median.

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61. In a ABC, find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.



62. In ABC, AD is the median through A and E is the mid-point of AD. BE produced meets AC in F (Figure).

Prove that
$$AF = rac{1}{3}AC$$

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63. In Figure, AD, and BE are medians of ABC and $BE \mid DF$. Prove that $CF = \frac{1}{4}AC$.

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64. P, Q and R are, respectively, the mid-points of sides BC, CA and AB of a triangle ABC, PR and BQ meet at $X\dot{C}R$ and PQ meet at Y. Prove that $XY = \frac{1}{4}BC$.

65. P is the mid-point of side AB of a parallelogram ABCD. A Line through B parallel to PD meets DC at Q and AD produced at R. Prove that (i) AR = 2BC (ii) BR = 2BQ.



66. In Figure, ABCD is a trapezium in which side AB is a parallel to side DC and E is the mid-point of side AD. If F is a point on the side BC such that the segment EF is parallel to side DC. Prove that F is the mid point of BC and $EF = \frac{1}{2}(AB + DC)$.

67. In Figure, ABCD is a parallelogram. E and F are the mid-points of the sides AB and CD respectively. Prove that the line segments AF and CE triset (divide into three equal parts) the diagonal BD.

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68. ABCD is a parallelogram. P is a point on AD such that $AP = \frac{1}{3}AD$ and Q is a point on BC such that $CQ = \frac{1}{3}BP$. Prove that AQCP is a parallelogram.

69. In a $\triangle ABC$, BM and CN are perpendiculars from B and C respectively on any line passing through A. If L is the mid-point of BC, prove that ML = NL..

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70. In Figure, M, N and P are the mid-points of AB, ACand BC respectively. If MN = 3cm, NP = 3.5cm and MP = 2.5cm, calculate BC, AB and AC.



71. Prove that the line segment joining the mid-points of

the diagonals of a trapezium is parallel to each of the

parallel sides and is equal to half the difference of these

sides.



72. In a triangle ABC median AD is produced to X such

that AD = DX. Prove that ABXC is a parallelogram.

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73. In ΔABC the lines are drawn parallel to BC,CA and AB respectively through A,B and C intersecting at P, Q and R. Find the ration of perimeter of ΔPQR and ΔABC



74. ABCD is a kite having AB = AD and BC = CD. Prove that the figure formed by joining the mid-points of the sides, in order, is a rectangle.

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75. Prove that In a parallelogram, opposite side are equal

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76. The opposite angles of a parallelogram are equal.

77. The sides BA and DC of a quadrilateral ABCD are produced as shown in Figure. Prove that a + b = x + y. Figure

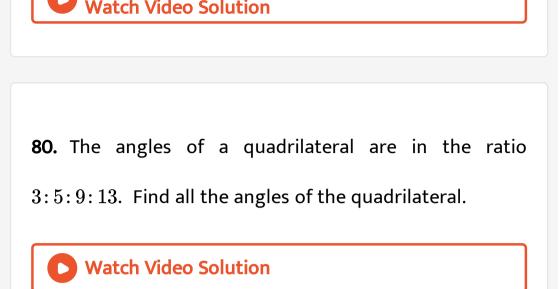
78. In a quadrilateral
$$ABCD$$
, AO and BO are the bisectors of $A \angle$ and $\angle B$ respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$.

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.

79. The angle of quadrilateral are respectively $100^0, 98^0, 92^0$. Find the fourth angle.





81. A diagonal of parallelogram divides it into two congruent triangles.

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82. In Figure, bisectors of $\angle B$ and $\angle D$ of quadrilateral

ABCD meet CD and AB produced at Pand Q

respectively.

Prove

that

$$igtriangle P + igtriangle Q = rac{1}{2}(igtriangle ABC + igtriangle ADC)$$

83. In a quadrilateral
$$ABCD$$
, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$.

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84. Let ABC be an isosceles triangle with AB = AC and let D, E, F be the mid points of BC, CA and ABrespectively. Show that $AD \perp FE$ and AD is bisected by FE.



85. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that (i) D is the mid-point of AC (ii) $MD \perp AC$ (iii) $CM = MA = \frac{1}{2}AB$

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86. The line drawn through the mid-point of one side of a triangle, parallel to another side, intersects the third side at its mid-point.



87. In Figure, D, E and F are, respectively the mid-points of sides BC, CA and AB of an equilateral triangle ABC. Prove that DEF is also an equilateral triangle.

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88. In ΔABC , D, E and F are respectively the mid-points

of sides AB, BC and CA. Show that ΔABC is divided into

four congruent triangles by joining D, E and F.



89. I, m and n are three parallel lines intersected by transversals p and q such that I, m and n cut off equal

intercepts AB and BC on p (see Fig.). Show that I, m and n

cut off equal intercepts DE and EF on q also

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90. ABCD is a square E, F, G and H are points on AB, BC, CD and DA respectively, such that AE = BF = CG = DH. Prove that EFGH is square.



91. ABCD is a rhombus, EABF is a straight line such that EA = AB = BF. Prove that ED and FC when produced meet at right angles.



92. ABCD is a parallelogram. AD is a produced to E so that DE = DC and EC produced meets AB produced

in $F \cdot$ Prove that $BF = BC \cdot$



93. The line segment joining the mid-points of any two sides of a triangle in parallel to the third side and equal to half of it.



94. In a quadrilateral ABCD, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$

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95. The angle of a quadrilateral are respectively 100^0 , 98^0 , 92^0 . Find the fourth angle.

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96. In a quadrilateral ABCD, the angles A, B, C and D are in the ratio 1:2:3:4. Find the measure of each angles of the quadrilateral.



97. The sides BA and DC of a quadrilateral ABCD are produced as shown in Figure. Prove that a + b = x + y.

Figure

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98. In a quadrilateral ABCD, AO and BO are the bisectors of $A \angle$ and $\angle B$ respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$.

99. In Figure, bisectors of $\angle B$ and $\angle D$ of quadrilateral ABCD meet CD and AB produced at Pand Q respectively. Prove that : $\angle P + \angle Q = \frac{1}{2}(\angle ABC + \angle ADC)$

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100. The angle of a quadrilateral are respectively 100^0 , 98^0 , 92^0 . Find the fourth angle.

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101. In a quadrilateral ABCD, the angles A, B, C and D are in the ratio 1:2:4:5. Find the

measure of each angles of the quadrilateral.



102. In a quadrilateral ABCD, CO and DO are the bisectors of $\angle C$ and $\angle D$ respectively. Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$.

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103. The angles of a quadrilateral are in the ratio 3:5:9:13. Find all the angles of the quadrilateral.



two consecutive angles is 180° .

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105. In a parallelogram $ABCD, ar{a}D = 115^0, $ determine
the measure of $\angle A$ and $\angle B$.
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106. In Figure, ABCD is a parallelogram. Compute the

values of x and y

107. In Figure, find the four angles A, B, C and D in the

parallelogram ABCD

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108. In a parallelogram ABCD diagonals AC and BDintersect at O and AC = 6.8 cm and BD = 5.6cm . Find the measures of OC and OD.

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109. ABCD is a parallelogram and line segments AX, CY bisect the angles A and C, respectively. Show that $AX \mid \ \mid CY$



110. Given $\triangle ABC$, lines are drawn through A, B and C parallel respectively to the sides BC, CA and AB, forming $\triangle PQR$. (Figure). Show that $BC = \frac{1}{2}QR$.

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111. In Figure, AN and CP are perpendicular to the diagonal BD of a parallelogram ABCD. Prove that : (i) $ADN \cong CBP$

(ii) AN = CP

112. In Figure, PQRS is a parallelogram, PO and QO are, respectively, the angle bisectors of $\angle P$ and $\angle Q$. Line LOM is drawn parallel to PQ. Prove that:

- (i) PL = QM
- (ii) LO = OM

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113. The diagonals of a parallelogram ABCD intersect at

O. A line through O intersects AB at X and DC at Y.

Prove that OX = OY.

114. In Figure, ABCD is a parallelogram and $\angle DAB = 60^{\circ}$. If the bisectors AP and BP of angles A and B respectively, meet at P on CD, prove that P is the mid-point of CD.

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115. In a parallelogram ABCD, the bisector of $\angle A$ also

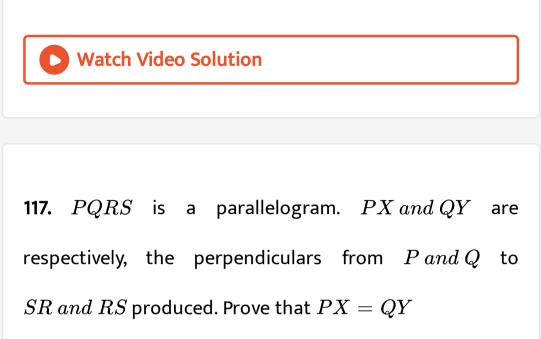
bisects BC at X. Prove that AD = 2AB.



116. ABCD is a parallelogram. L and M are points on

 $AB \ and \ DC$ respectively and AL = CM . Prove that

LM and BD bisect each other.



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118. ABCD is a parallelogram. AB is produced to E so

that BE = AB. Prove that ED bisects BC.

119. Two opposite angles of a parallelogram are $(3x-2)^0$ and $(50-x)^0$. Find the measure of each angle of the parallelogram.



120. If an angle of a parallelogram is two-third of its

adjacent angle, find the angles of the parallelogram.



121. Find the measure of all the angles of a parallelogram,

if one angle is 24^0 less than twice the smallest angle.

122. The perimeter of a parallelogram is 22cm. If the longer side measures 6. 5cm what is the measure of the shorter side?

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123. In a parallelogram $ABCD, \ \angle D = 135^0, \$ determine

the measures of $\angle A$ and $\angle B$

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124. ABCD is a parallelogram in which $\angle A = 70^{\circ}$.

Compute $\angle B$, $\angle C$ and $\angle D$



125. In Figure, ABCD is a parallelogram in which $\angle A = 60^0$. If the bisectors of $\angle A$ and $\angle B$ meet at P, prove that AD = DP, PC = BC and DC = 2AD. Figure

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126. In Figure, ABCD is a parallelogram in which $\angle DAB = 75^0 and \angle DBC = 60^0$. Compute $\angle CDB and \angle ADB$

127. ABCD is a parallelogram and E is the mid-point of BC, DE and AB when produced meet at F. Then $AF = \frac{3}{2}AB$ (b) 2 AB (c) 3 AB (c) $\frac{5}{4}AB$

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128. Which of the following statements are true (T) and which are false (F)? (i) In a parallelogram, the diagonals are equal. (ii) In a parallelogram, the diagonals bisect each other. (iii) In a parallelogram, the diagonals intersect each other at right angles. (iv) In any quadrilateral, if a pair of opposite sides is equal, it is a parallelogram. (v) If all the angles of a quadrilateral are equal, it is a parallelogram. (vi) If three sides of a quadrilateral are

equal, it is a parallelogram. (vii) If three angles of a quadrilateral are equal, it is a parallelogram. (viii) If all the sides of a quadrilateral are equal it is a parallelogram



129. Show that if the diagonals of a quadrilateral bisect

each other at right angles, then it is a rhombus.



130. Show that the diagonals of a square are equal and

bisect each other at right angles.



131. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square

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132. In a triangle ABC median AD is produced to X such that AD = DX. Prove that ABXC is a parallelogram.



133. In Figure, ABCD is a parallelogram and X, Y are the mid-points of sides AB and DC respectively. Show

that AXCY is a parallelogram.



134. In Figure, X, Y are the mid-points of opposite sides AB and DC of a parallelogram ABCD. AY and DX are joined intersecting in P; CX and BY are joined intersecting in Q. Show that
(i) AXCY is a parallelogram
(ii) DXBY is a parallelogram

(iii)PXQY is a parallelogram



135. Two segments AC and BD bisect each other at O.

Prove that ABCD is a parallelogram.



136. In Figure, ABCD is a parallelogram and X and Yare points on the diagonal BD such that DX = BY. Prove that AXCY is a parallelogram (ii) AX = CY, AY = CX $AYB \cong CXD$ (iv) $AXD \cong CYB$

137. ABC is an isosceles triangle in which AB = AC . AP bisects exterior angle DAC and CP II AB . Show that angle PAC = Angle BCA (ii) ABCP is a Parallelogram

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138. AB, CD are two parallel lines and a transversal l intersects AB at X and CD at Y Prove that the bisectors of the interior angles form a parallelogram, with all its angles right angles i.e., it is a rectangle.



139. If ABC and DEF are two triangles such that AB, BC are respectively equal and parallel to DE, EF. Then show that

(i) Quadrilateral ABED is a parallelogram

(ii) Quadrilateral BCFE is a parallelogram

(iii) AC = DF

(iv) $ABC \cong DEF$

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140. PQRS is a square such that PR and SQ intersect

at O. State the measure of $\angle POQ$.

141. The diagonals of a rectangle ABCD meet at O . If

 $\angle BOC = 44^0, \text{ find } \angle OAD$



142. If PQRS is a square, then write the measure of $\angle SRP$

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143. If ABCD is a rectangle with $\angle BAC = 32^0$, find the

measure of $\angle DBC$

144. If ABCD is a rhombus with $\angle ABC = 56^{\circ}$, find the measure of $\angle ACD$ Watch Video Solution

145. ABCD is a rhombus. Show that diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.

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146. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that:(i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D$.

147. In Figure, ABCD is a trapezium in which ABCDand AD = BC show that : $\angle A = \angle B$ (ii) $\angle C = \angle D$ $ABC \cong BAD$ diagonal AC = diagonalBD



148. In Figure, ABCD is a trapezium in which $AB \mid |CD \text{ and } AD = BC$. Show that : (i) $\angle A = \angle B$ (ii) $\angle C = \angle D$ (iii) $ABC \cong BAD$ (iv) diagonal AC = diagonalBD



149. In a parallelogram ABCD , determine the sum of

angles $\angle C$ and $\angle D$



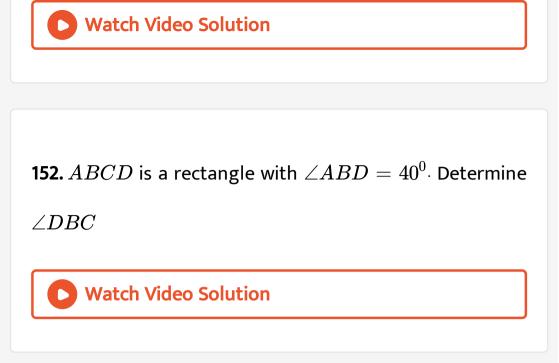
150. In a parallelogram ABCD, if $\angle D = 135^{0}$,

determine the measures of its other angles.



151. ABCD is a square. AC and BD intersect at O. State

the measure of $\angle AOB$.



153. The sides AB and CD of a parallelogram ABCD are bisected at E and F. Prove that EBFD is a parallelogram.

154. P and Q are the points of trisection of the diagonal BD of a parallelogram ABCD. Prove that CQ is parallel to AP. Prove also that AC bisects PQ



155. ABCD is a square E, F, G and H are points on AB, BC, CD and DA respectively, such that AE = BF = CG = DH. Prove that EFGH is square.



156. ABCD is a rhombus, EABF is a straight line such that EA = AB = BF. Prove that ED and FC when

produced meet at right angles.



157. ABCD is a parallelogram. AD is a produced to E so that DE = DC and EC produced meets AB produced in F. Prove that BF = BC.

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158. In Figure, D, E and F are, respectively the mid-points of sides BC, CA and AB of an equilateral triangle ABC. Prove that DEF is also an equilateral triangle.

159. Prove that the four triangles formed by joining in pairs, the mid-points of three sides of a triangle, are congruent to each other.

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160. I, m and n are three parallel lines intersected by transversals p and q such that I, m and n cut off equal intercepts AB and BC on p (see Figure). Show that I, m and n cut off equal intercepts DE and EF on q also.

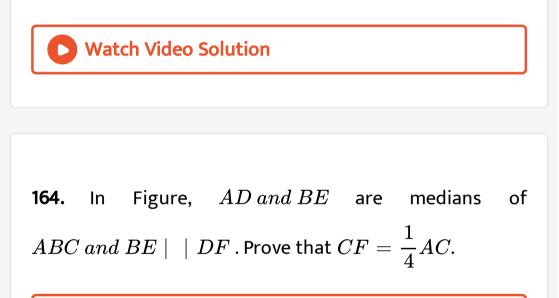


161. Let ABC be an isosceles triangle with AB = ACand let D, E, F be the mid points of BC, CA and ABrespectively. Show that $AD \perp FE$ and AD is bisected by FE.



162. ABC is a triangle right angled at B; and P is the mid-point of AC . Prove that: $PQ \perp AB$ (ii) Q is the mid point of $AB \ PB = PA = rac{1}{2}AC$

163. P, Q and R are, respectively, the mid points of sides BC, CA and AB of a triangle ABC and AD is the perpendicular from vertex A to BC, then prove that the points P,Q,R and D are cyclic.





165. In ABC, AD is the median through A and E is the mid-point of AD. BE produced meets AC in F (Figure).

Prove that
$$AF = \frac{1}{3}AC$$
.

166. In a ABC, find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.



167. In Figure, AD is the median and $DE \mid \ \mid AB$. Prove

that BE is the median.



168. ABCD is a rhombus and P, Q, R, S are the midpoints of AB, BC, CD, DA respectively. Prove that PQRS is a rectangle.

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169. Show that the line segments joining the mid-points

of the opposite sides of a quadrilateral bisect each other.



170. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.



171. ABCD is a rhombus and P, Q, R, S are the midpoints of AB, BC, CD, DA respectively. Prove that PQRS is a rectangle.



172. The diagonals of a quadrilateral ABCD are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle.

173. Show that the quadrilateral, formed by joining the

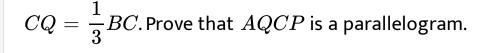
mid-points of the sides of a square is also a square.



174. In Figure, ABCD is a parallelogram. E and F are the mid-points of the sides AB and CD respectively. Prove that the line segments AF and CE trisect (divide into three equal parts) the diagonal BD.



175. ABCD is a parallelogram. P is a point on AD such that $AP = \frac{1}{3} AD$ and Q is a point on BC such that



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- **176.** P is the mid-point of side AB of a parallelogram ABCD. A line through B parallel to PD meets DC at Q and AD produced at R. Prove that:
- (i) AR = 2BC
- (ii) BR = 2 BQ

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177. In Figure, ABCD is a trapezium in which side AB is a parallel to side DC and E is the mid-point of side AD. If F is a point on the side BC such that the segment EF is

parallel to side DC . Prove that F is the mid point of BC

and
$$EF=rac{1}{2}(AB+DC).$$



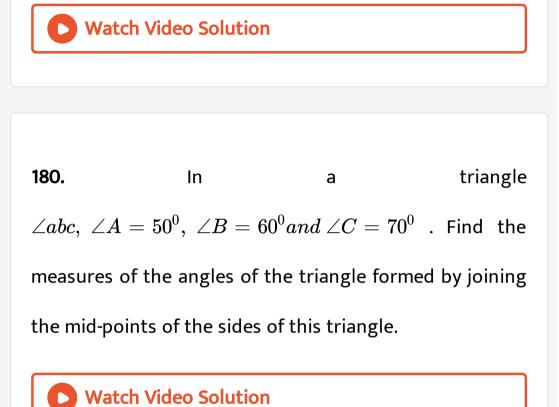
178. Prove that the line segment joining the mid-points of the diagonals of a trapezium is parallel to each of the parallel sides and is equal to half the difference of these sides.

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179. In $\triangle ABC$, D, E and F are, respectively, the midpoints of BC, CA and AB . If the lengths of side

AB, BC and CA are 7cm, 8cm, and 9cm, respectively,

find the perimeter of $\triangle DEF$.



181. In a triangle, $P, \ Q \ and \ R$ are the mid-points of sides

BC, CA and AB respectively.

 $AC = 21 \ cm, \ BC = 29 cm \ and \ AB = 30 cm, \ \ {
m find} \ \ {
m the}$

perimeter of the quadrilateral ARPQ



182. In a ABC median AD is produced to X such that AD = DX. Prove that ABXC is a parallelogram.

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183. In a ABC, E and F are the mid-points of AC and AB respectively. The altitude AP to BC intersects FE at Q. Prove that AQ = QP.



184. In a $\triangle ABC$, BM and CN are perpendiculars from B and C respectively on any line passing through A. If L is the mid-point of BC, prove that ML = NL.

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185. In triangle ABC is right-angled at B. Given that

 $AB = 9cm, \ AC = 15cm$ calculate B C`.

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186. M, N and P are the mid-points ofAB, AC and BCrespectively.If

MN = 3cm, NP = 3.5cm and MP = 2.5cm

,

calculate BC, AB and AC



187. ABC is a triangle and through A, B, C lines are drawn parallel to BC, CA and AB respectively intersecting at P, Q and R. Prove that the perimeter of PQR is double the perimeter of ABC

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188. In Figure, $BE \perp AC, AD$ is any line from $A \rightarrow BC$ intersecting BE in $H\dot{P}, Q \, and R$ are

respectively the mid-points of AH, AB and BC. Prove

that $\angle PQR = 90^{\circ}$



189. In figure AB = AC and $CP \mid BA$ and AP is the

bisector of exterior $\angle CAD$ of ABC . Prove that

(i) $\angle PAC = \angle BCA$

(ii) ABCP is a parallelogram

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190. Let ABC be an isosceles triangle in which AB = AC. If D, E, F be the mid-points of the sides

BC, CA and AB respectively, show that the segment

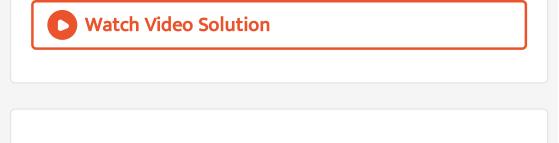
AD and EF bisect each other at right angles.

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191.
$$ABC$$
 is a triangle. D is a point on AB such that
 $AD = \frac{1}{4}AB$ and E is a point on AC such that
 $AE = \frac{1}{4}AC$. Prove that $DE = \frac{1}{4}BC$

192. In Figure, ABCD is a parallelogram in which P is the mid-point of DC and Q is a point on AC such that $CQ = \frac{1}{4}AC$. If PQ produced meets BC at R, prove that R is a mid-point of BC.



193. In Figure, ABCD and PQRC are rectangles and Q is the mid-point of AC . Prove that DP = PC (ii) $PR = \frac{1}{2} AC$

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194. ABCD is a parallelogram, E and F are the midpoints of AB and CD respectively. GH is any line intersecting AD, EF and BC at G, P and Hrespectively. Prove that GP = PH

195. BM and CN are perpendicular to a line passing through the vertex A of a triangle ABC. If L is the midpoint of BC, prove that LM = LN.

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196. Show that the line segments joining the mid-points

of the opposite sides of a quadrilateral bisect each other

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197. Fill in the blanks to make the following statements correct The triangle formed by joining the mid-points of the sides of an isosceles triangle is The triangle formed



198. In a parallelogram ABCD , write the sum of angle

A and B

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199. In a parallelogram ABCD, if $\angle D = 115^0$, then

write the measure of $\angle A$



200. PQRS is a square such that PR and SQ intersect

at O. State the measure of $\angle POQ$

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201. In a quadrilateral ABCD, bisectors of angles A and B intersect at O such that $\angle AOB = 75^0$, then write the value of $\angle C + \angle D$

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202. The diagonals of a rectangle ABCD meet at O_{\cdot} If $\angle BOC = 44^0$, find $\angle OAD$

203. If PQRS is a square, then write the measure of $\angle SRP$

A. $90^{\,\circ}$

B. $45^{\,\circ}$

C. 40°

D. 50°

Answer: B



204. If *ABCD* is a rectangle with $\angle BAC = 32^{0}$, find the measure of $\angle DBC$. Watch Video Solution

205. If ABCD is a rhombus with $\angle ABC = 56^{\circ}$, find the

measure of $\angle ACD$

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206. The perimeter of a parallelogram is 22cm. If the longer side measures 6.5cm, what is the measure of shorter side?

207. If the angles of a quadrilateral are in the ratio 3:5:9:13, then find the measure of smallest angle.

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208. If the bisectors of two adjacent angles A and B of a quadrilateral ABCD intersect at a point O such that $\angle C + \angle D = k \angle AOB$, then find the value of k.

209. In a parallelogram ABCD, if $\angle A = (3x-20)^0, \ \angle B \ (y+15)^0, \ \angle C = (x+40)^0,$

then find the values of $x \ and \ y$

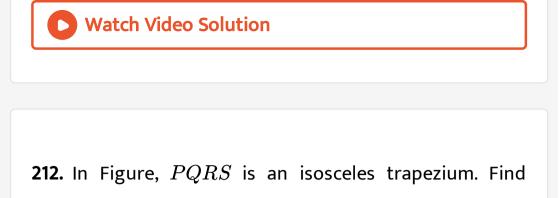
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210. If measures opposite angles of a parallelogram are $(60 - x)^0$ and $(3x - 4)^0$, then find the measure of angles of the parallelogram.



211. In a parallelogram ABCD, the bisector of $\angle A$ also

bisects BC at X. Find AB:AD



x and y



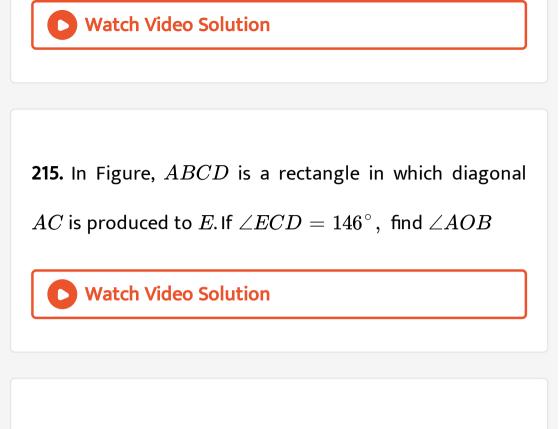
213. In Figure, ABCD is a trapezium. Find the value of

x and y



214. In Figure, PQRS is a rhombus in which the diagonal

PR is produced to T · If $\angle SRT = 152^{0}, ext{ find } x, ext{ } y ext{ and } z$

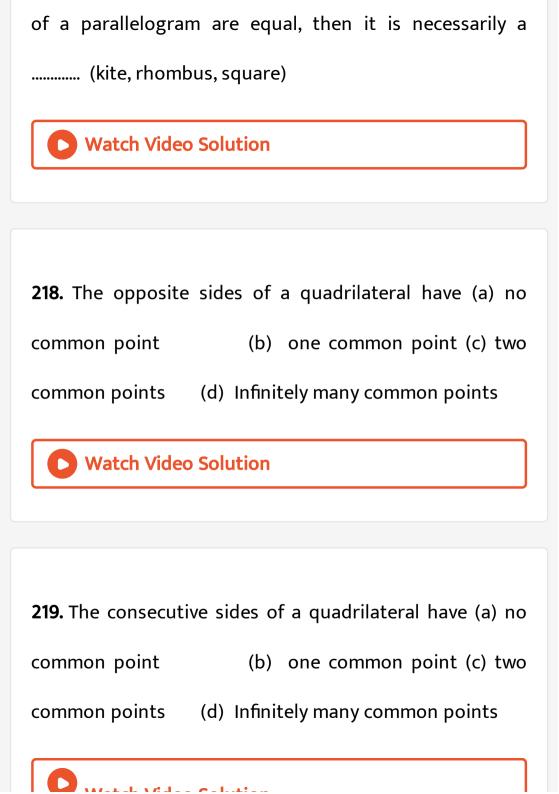


216. ABCDisaparallelogram. If/_C=58,find/_A`

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217. Complete each of the following statements by means of one of those given in brackets again each: If one pair of opposite sides are equal and parallel, then the figure is

...... (parallelogram, rectangle, trapezium) If in a quadrilateral only one pair of opposite sides are parallel, the quadrilateral is (square, rectangle, trapezium) A line drawn from the mid-point of one side of a triangle another side intersects the third side at its mid-(perpendicular to, parallel to, to meet) If one point. angle of a parallelogram is a right angle, then it is necessarily a (rectangle, square, rhombus) Consecutive angles of parallelogram are (supplementary, complementary) If both pairs of opposite sides of a quadrilateral are equal, then it is necessarily (rectangle, parallelogram, rhombus) if opposite angles of a quadrilateral are equal, then it is necessarily a (parallelogram, rhombus, rectangle) If consecutive sides



220. PQRS is a quadrilateral. PR and QS intersect each other O. In which of the following cases, PQRS is a parallelogram?

(i)
$$_\angle P = 100^{\circ}, \angle Q = 80^{\circ}, \angle R = 95^{\circ}$$

(ii)
$$\angle P=85^{0},\ \angle Q=85^{0},\ \angle R=95^{0}$$

(iii)

 $PQ=7CM,\;QR=7CM,\;RS=8CM,\;SP=8CM$ (iv)

 $OP=6.\ 5cm,\ OQ=6.\ 5cm,\ OR=5.\ 2cm,\ OS=5.\ 2cm$

221. Which of the following quadrilateral is not a rhombus? a.All four sides are equal b.Diagonals bisect each other c.Diagonals bisect opposite angles d.One angle between the diagonals is 60^{0}

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222. Diagonals necessarily bisect opposite angles in a (a)

rectangle

(b) parallelogram (c) isosceles

trapezium (d) square

223. If the two diagonals of a parallelogram are equal, it is

a rectangle.

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224. The bisectors of any two adjacent angles of a parallelogram intersect at:

A. $30^{\,\circ}$

B. $45^{\,\circ}$

 $\mathsf{C.}\,60^{\,\circ}$

D. 90°

Answer: D



225. Show that the bisectors of angles of a parallelogram

form a rectangle.

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226. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a (a) parallelogram (b) rectangle (c)square (d) rhombus



227. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a

A. parallelogram

B. rectangle

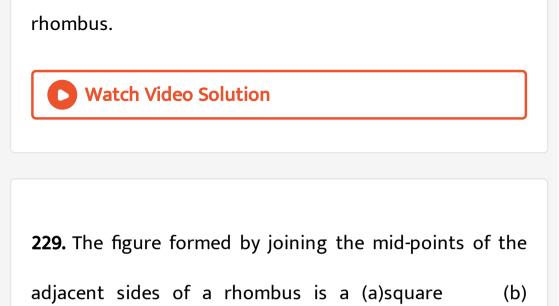
C. rhombus

D. trapezium

Answer: A



228. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a



rectangle (c) trapezium (d) none of these



230. Show that the quadrilateral, formed by joining the

mid-points of the sides of a square, is also a square.

231. The figure formed by joining the mid-point of the adjacent sides of a parallelogram is a (a)rectangle (b) parallelogram (c) rhombus (d) square

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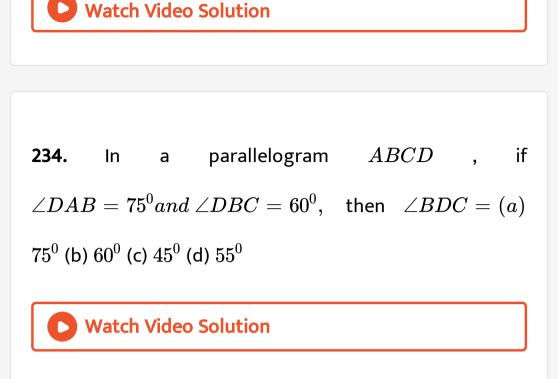
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232. Find the measure of all the angles of a parallelogram,

if one angle is 24^0 less than twice the smallest angle.

233. In a parallelogram ABCD , if $\angle DAB = 75^0 and \angle DBC = 60^0$, then $\angle BDC =$ (a) 75^0 (b) 60^0 (c) 45^0 (d) 55^0





235. ABCD is a parallelogram and E and F are the centroids of triangles ABD and BCD respectively, then EF =

(a)AE

(b) *BE*

(c) *CE*

(d) DE

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236. ABCD is a parallelogram, M is the mid-point of BDand BM bisects $\angle B$. Then, $\angle AMB = ~45^{0}$ (b) 60^{0} (c) 90^{0} (d) 75^{0}

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237. ABCD is a parallelogram and E is the mid-point of BC, DE and AB when produced meet at F. Then AF =

A.
$$\frac{3}{2}AB$$

 $\mathsf{B.}\,2AB$

C. 3*AB*

D.
$$rac{5}{4}AB$$

Answer: B

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238. If an angle of a parallelogram is two-third of its adjacent angle, find the smallest angle of the parallelogram.

B. 72^{0}

 $C. 90^{0}$

D. none of these

Answer: B

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239. If the degree measures of the angles of quadrilateral are 4x, 7x, 9x and 10x, what is the sum of the measures of the smallest angle and largest angle? (a) 140^{0} (b) 150^{0} (c) 168^{0} (d) 180^{0}

240. In a quadrilateral ABCD, $\angle A + \angle C$ is 2 times $\angle B + \angle D$. If $\angle A = 140^0$ and $\angle D = 60^0$, then $\angle B =$

A. (a) 60°

B. (b) 80^0

C. (c) 120^{0}

D. (d) None of these

Answer: A

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241. If the diagonals of a rhombus are 18 cm and 24 cm respectively, then its side is equal to

A. 16 cm

B. 15 cm

C. 20 cm

D. 17 cm

Answer: B

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242. The diagonals AC and BD of a rectangle ABCDintersect each other at P. If $\angle ABD = 50^{0}$, then $\angle DPC = 70^{0}$ (b) 90^{0} (c) 80^{0} (d) 100^{0}

243. ABCD is a parallelogram in which diagonal AC bisects $\angle BAD$. If $\angle BAC = 35^{0}$, then $\angle ABC =$ (a) 70^{0} (b) 110^{0} (c) 90^{0} (d) 120^{0}

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244. In a rhombus ABCD, if $\angle ACB = 40^{0}$, then $\angle ADB =$ (a) 70^{0} (b) 45^{0} (c) 50^{0} (d) 60^{0}

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245.

In

 $riangle ABC,\ ar{a}A=30^\circ,\ ar{a}B=40^\circ and\ ar{a}C=110^\circ.$ The

angles of the triangle formed by joining the mid-points of

the sides of this triangle are

```
A. (a) 70^\circ, \ 70^\circ, \ 40^\circ
```

```
B. (b) 60^\circ, \ 40^\circ, \ 80^\circ
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C. (c) $30^\circ, \ 40^\circ, \ 110^\circ$

D. (d) $60^\circ, ~70^\circ, ~50^\circ$

Answer: C

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246. The diagonals of a parallelogram ABCD intersect at O. If $\angle BOC = 90^0$ and $\angle BDC = 50^0$, then $\angle OAB =$ (a) 40^0 (b) 50^0 (c) 10^0 (d) 90^0



247. ABCD is a trapezium in which $AB \mid DC$, M and N are the mid-points of AD and BC respectively. If AB = 12CM, MN = 14CM, then CD =

A. 10cm

B. 12cm

C. 14cm

D. 16cm

Answer: D

248. Diagonals of a quadrilateral ABCD bisect each other. If $\angle A = 45^{0}$, then $\angle B =$ (a) 115^{0} (b) 120^{0} (c) 125^{0} (d) 135^{0}

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249. *P* is the mid-point of side *BC* of a parallelogram *ABCD* such that $\angle BAP = \angle DAP$. If AD = 10cm, then CD =

A. 5cm

B. 10cm

C. 6cm

D. 8cm



250. In ABC, E is the mid-point of median AD such that BE produced meets AC at F. If AC = 10.5 CM, then AF = (a) 3cm (b) 3.5cm (c) 2.5cm (d) 5cm