



MATHS

BOOKS - MTG IIT JEE FOUNDATION

CONGRUENCE OF TRIANGLES

Illustrations

1. Two line segment AB and CD are congruent.

If $AB = 6$ cm, then what is the length of CD?

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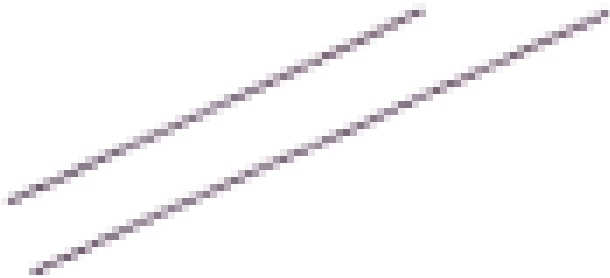
2. Two rectangles ABCD and EFGH are congruent.

If the length of the rectangle ABCD is 12 m and its perimeter is 40 m,

find the length and breadth of rectangle EFGH.

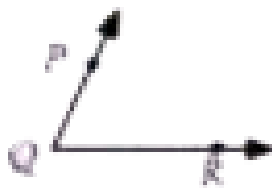
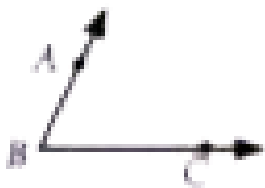
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3. Measure and find whether the given pair of segment is congruent or not.



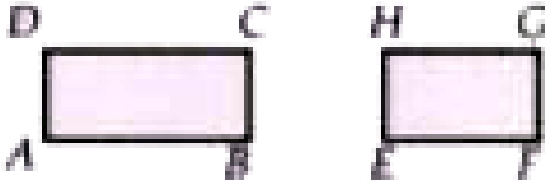
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4. Measure and find which pair is congruent.



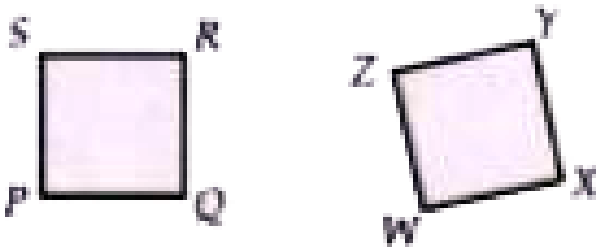
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5. Measure and find which pair is congruent.



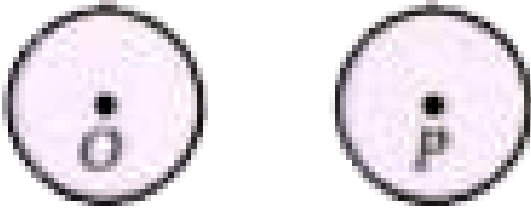
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6. Measure and find which pair is congruent.



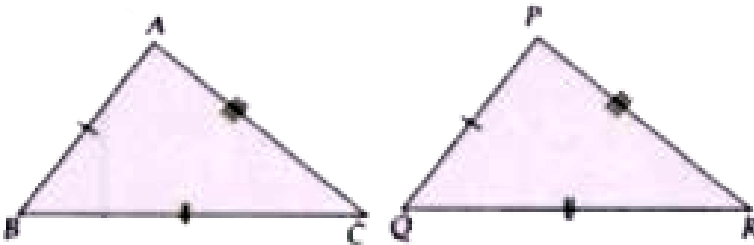
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7. Measure and find which pair is congruent.



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8. Draw a $\triangle ABC$ with $AB = 4$ cm, $BC = 6$ cm and $CA = 3$ cm. Draw another $\triangle PQR$ with $PQ = 4$ cm, $QR = 6$ cm and $RP = 3$ cm. State about the congruency of triangles.



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9. Draw a $\triangle ABC$ with $AB = 6$ cm, $CB = 4.4$ cm and $\angle B = 60^\circ$. Draw another $\triangle QPR$ with $QP = 6$ cm, $PR = 4.4$ cm and $\angle P = 60^\circ$. Check whether they are congruent or not.

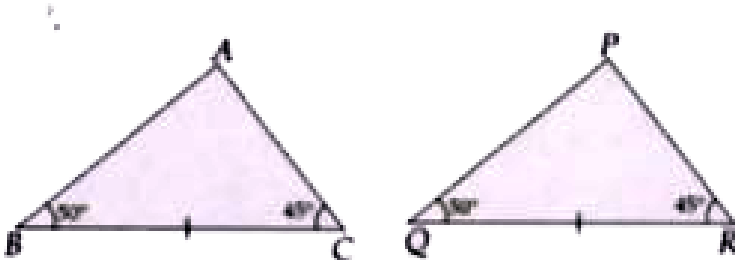


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10. Draw a $\triangle ABC$ with $BC = 5.8$ cm, $\angle B = 50^\circ$ and $\angle C = 45^\circ$.

Draw another $\triangle PQR$ with $QR = 5.8$ cm, $\angle Q = 50^\circ$ and $\angle R = 45^\circ$.

Are they congruent?



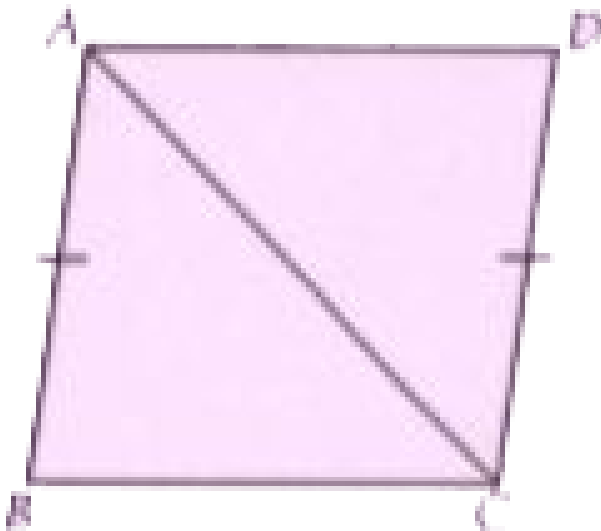
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11. Draw a $\triangle ABC$ with $\angle C = 90^\circ$, hypotenuse $AB = 5$ cm and side $AC = 4$ cm. Also, draw a $\triangle PQR$ with $\angle R = 90^\circ$, hypotenuse $PQ = 5$ cm and side $PR = 4$ cm.

State about the congruency of triangles.

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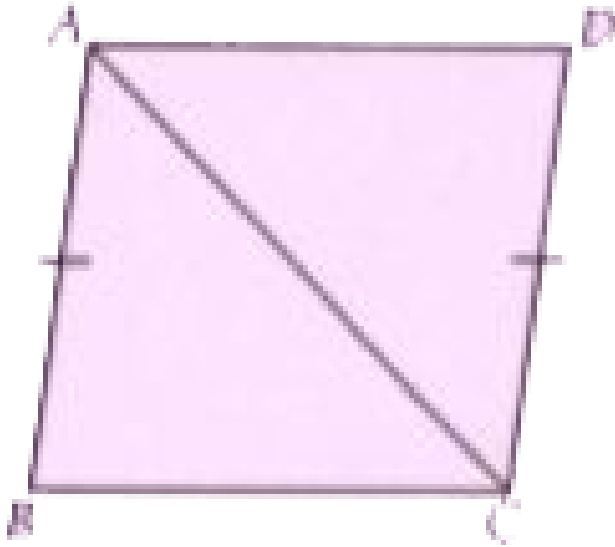
12. In figure, $AB \parallel DC$ and $AB = CD$.



Is $\angle BAC = \angle DCA$? Why?

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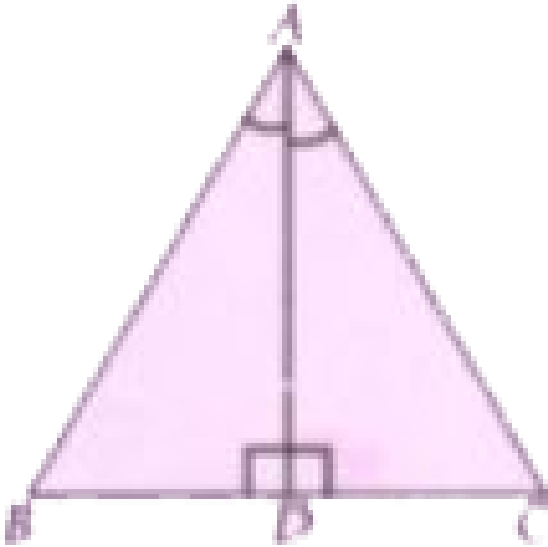
13. In figure, $AB \parallel DC$ and $AB = CD$.



Is $\triangle ABC \cong \triangle CDA$ by SAS congruence condition?

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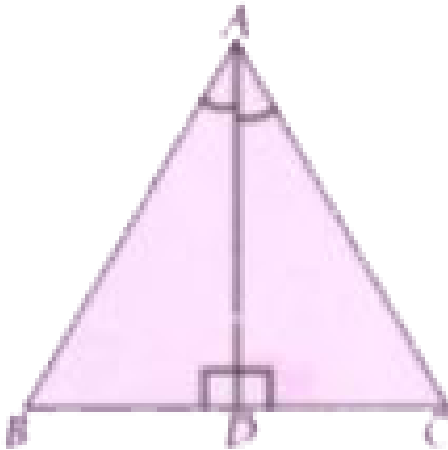
14. In figure, AD bisects $\angle A$ and $AD \perp BC$.



Is $\triangle ADB \cong \triangle ADC$ by ASA congruence condition?

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15. In figure, AD bisects $\angle A$ and $AD \perp BC$.



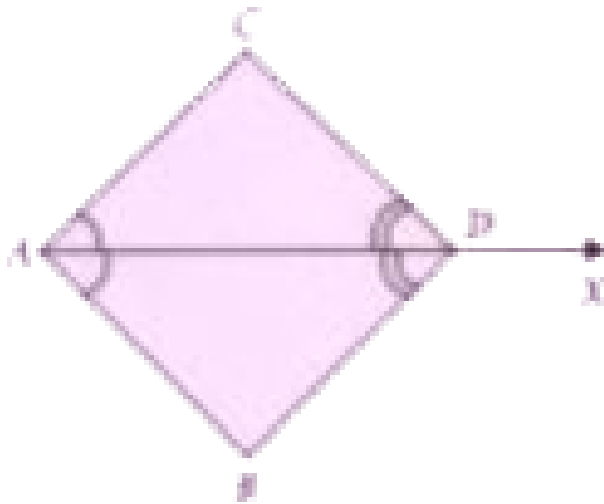
Is $BD = CD$? Why?

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16. To figure, AX bisects $\angle BAC$ and $\angle BDC$.

Find the third pair of corresponding parts to ensure that

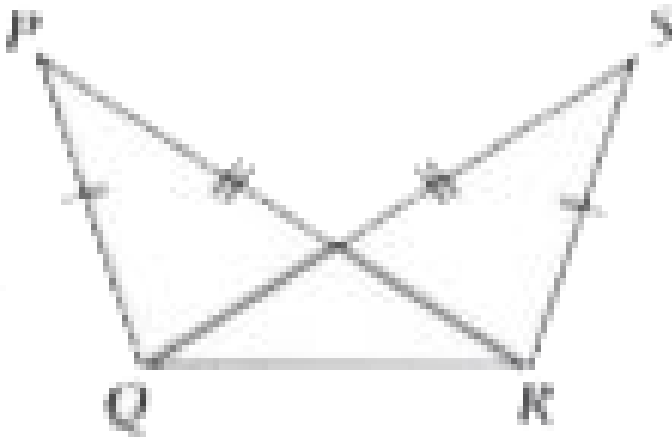
$\triangle ABD \cong \triangle ACD$ by ASA congruence criteria.



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Solved Examples

1. In the given figure, we have $PQ = SR$ and $Pr = SQ$. Prove that:

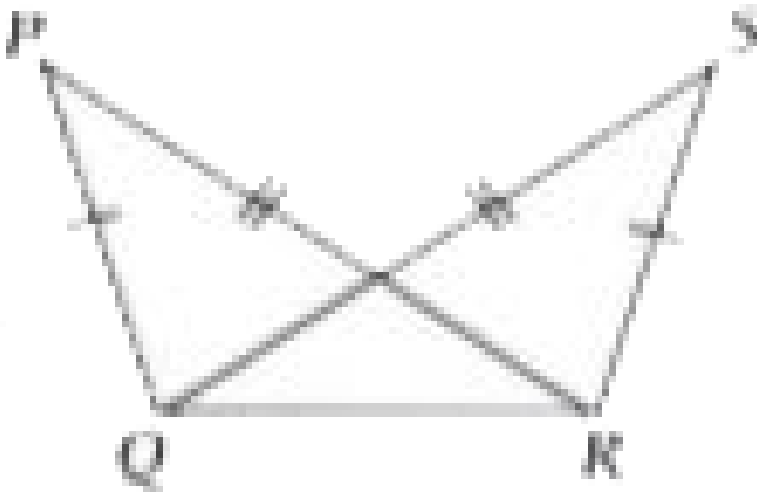


$$\triangle PQR \cong \triangle SRQ$$



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2. In the given figure, we have $PQ = SR$ and $Pr = SQ$. Prove that:



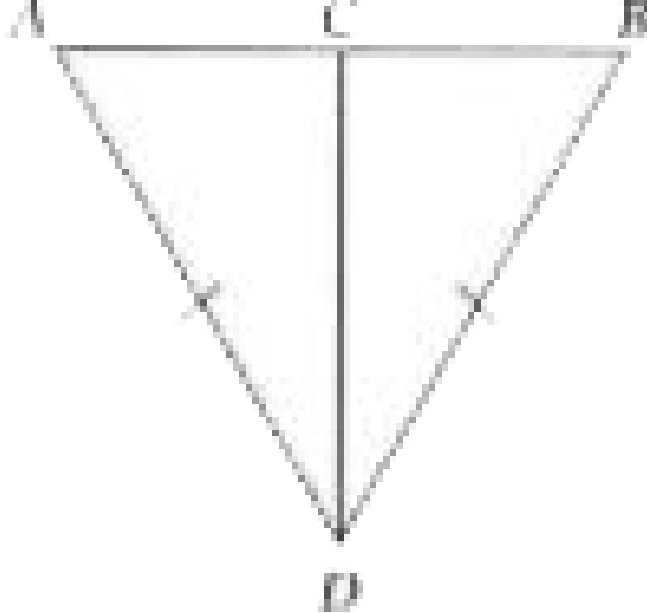
$$\angle PQR = \angle SRQ$$



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3. In the given figure, we have C is the mid-point of AB and $DA = DB$.

Prove that : $\angle DCA = \angle DCB$.

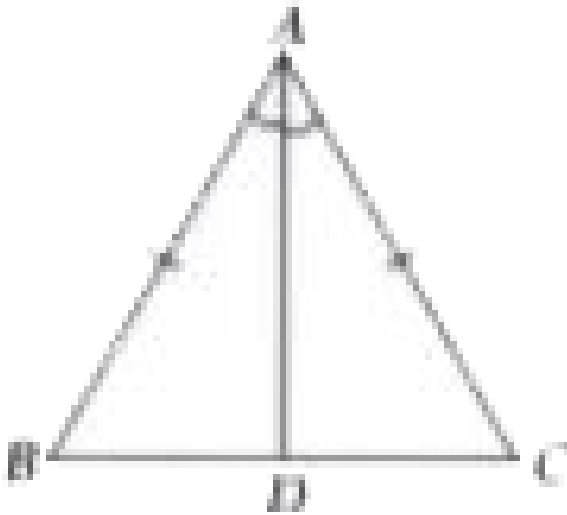


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4. The diagonals of a parallelogram bisect each other.

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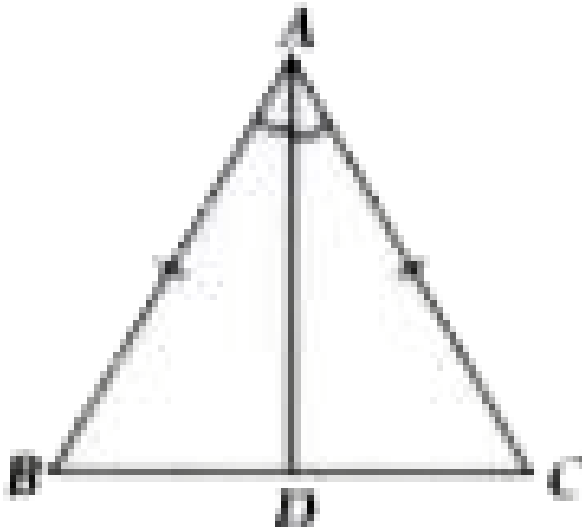
5. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is the bisector of $\angle A$. Prove that:



$$\triangle ADB \cong \triangle ADC$$

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6. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is the bisector of $\angle A$. Prove that:

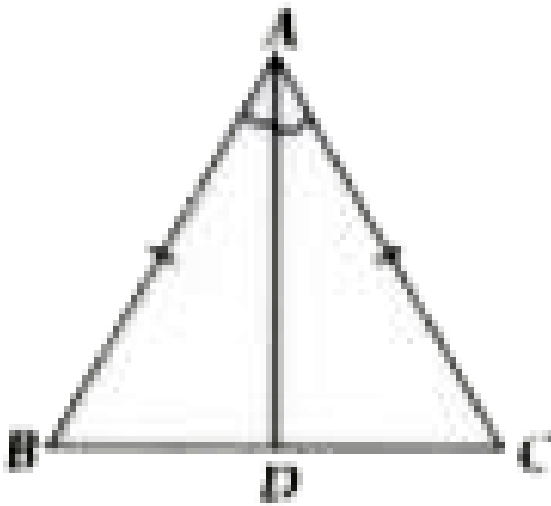


$$\angle B = \angle C$$



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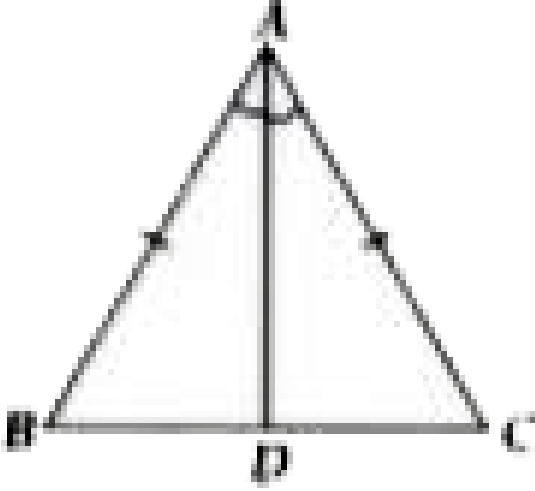
7. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is the bisector of $\angle A$. Prove that:



$$BD = CD$$

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8. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is the bisector of $\angle A$. Prove that:

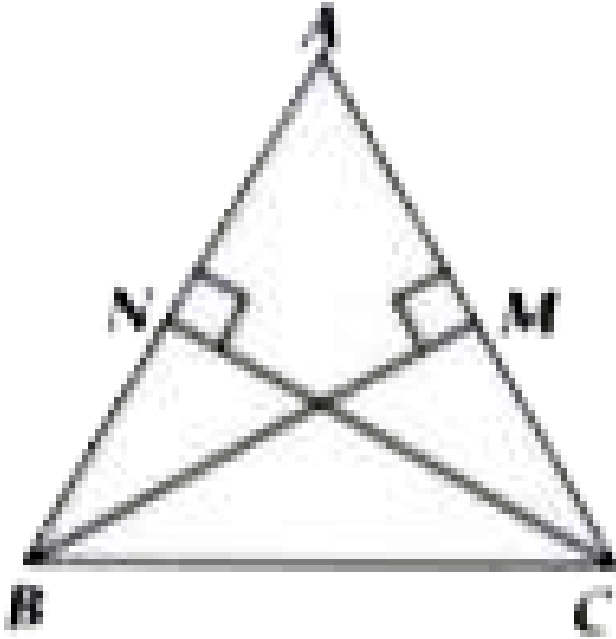


$$AD \perp BC$$

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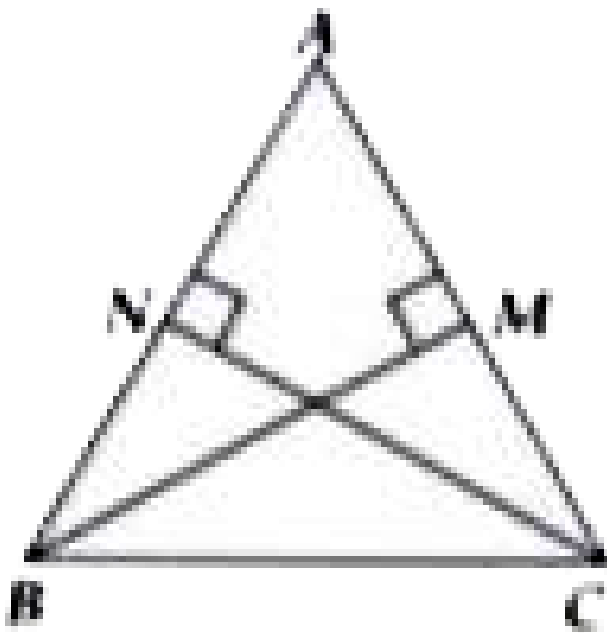
9. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$. If $BM \perp AC$ and $CN \perp AB$, prove that:

$$\Delta BMC \cong \Delta CNB$$



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10. In the adjoining figure, ΔABC is an isosceles triangle in which $AB = AC$. If $BM \perp AC$ and $CN \perp AB$, prove that:



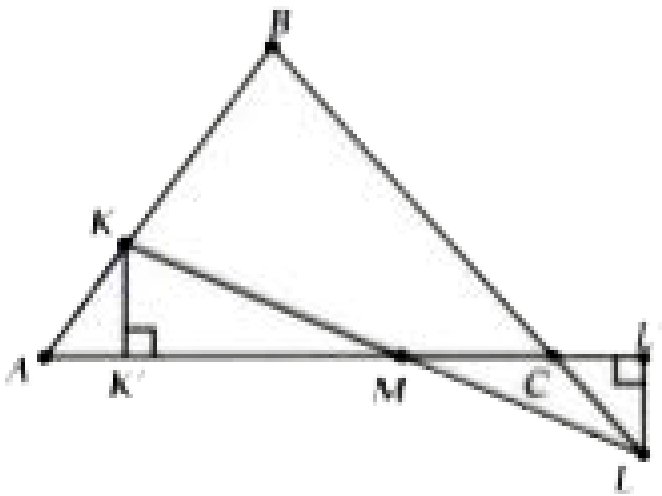
$$BM = CN$$



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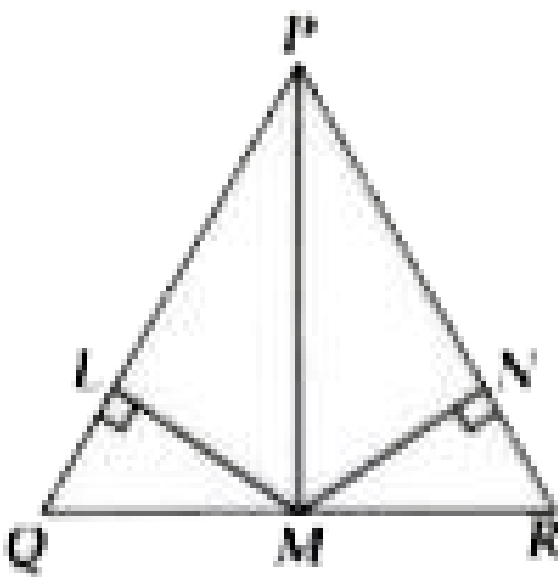
11. In the given figure, KK' and LL' are equal and perpendicular to AC .

Show that $\triangle KK'M$ and $\triangle LL'M$ are congruent.



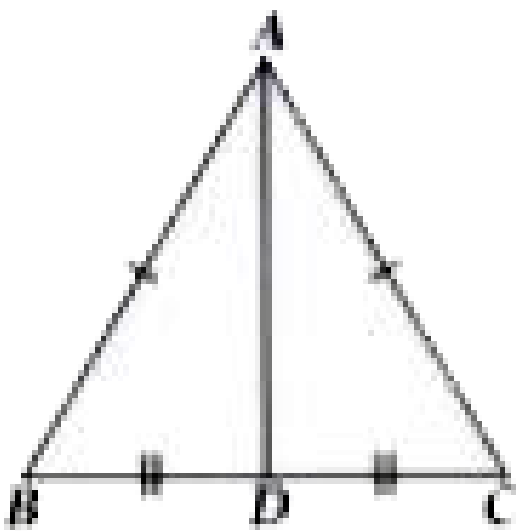
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12. In the figure, it is given that $LM = NM$, $ML \perp PQ$ and $MN \perp PR$. Prove that $\angle LPM = \angle NPM$.



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13. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is a median.

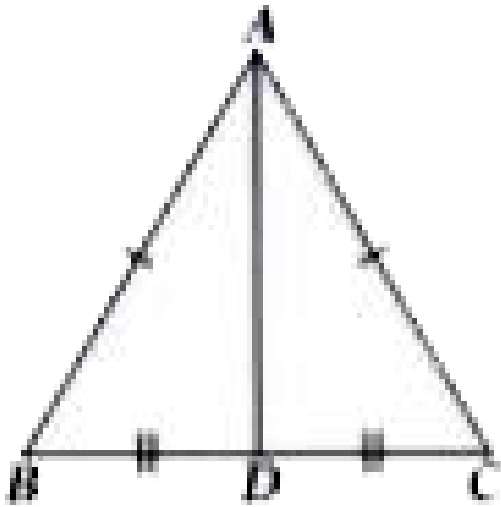


Prove that:

$$\triangle ADB \cong \triangle ADC$$

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14. In the adjoining figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and AD is a median.



Prove that:

$$\angle BAD = \angle CAD$$

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15. Show that the diagonals of a rhombus bisect each other at right angles.

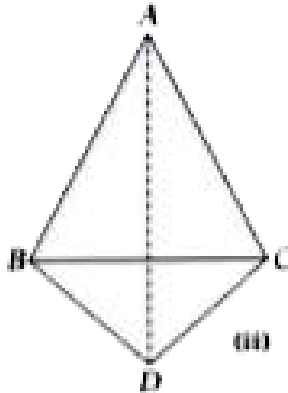
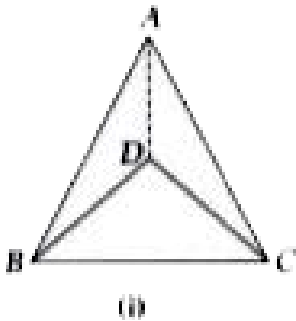
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16. If the opposite sides of a quadrilateral are equal, prove that the quadrilateral is a parallelogram.



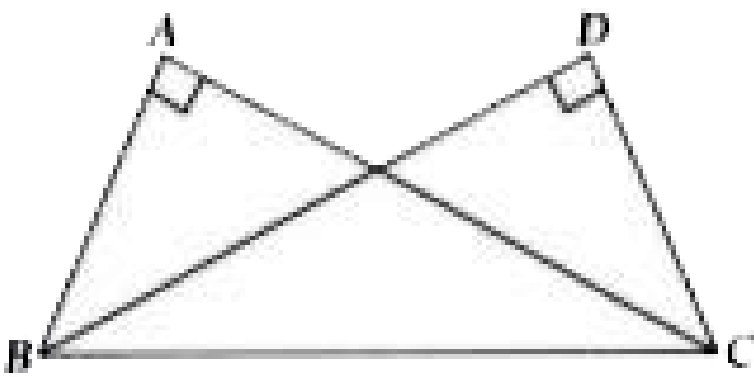
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17. In both the given figures, $AB = AC$ and $DB = DC$. Prove that $\angle ABD = \angle ACD$.



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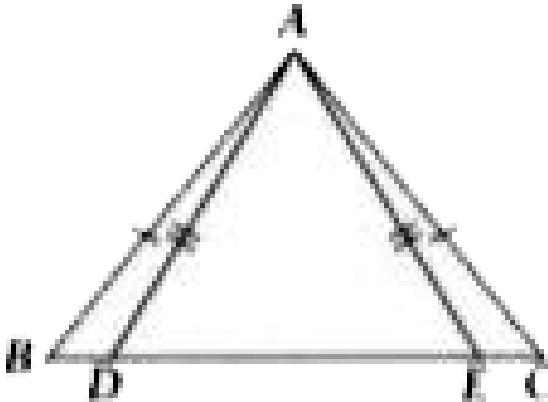
18. In the given figure, triangles ABC and DCB are right angled at A and D respectively and $AC = DB$, then prove that $\angle ACB = \angle DBC$.



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19. In the given figure, $AB = AC$ and $AD = AE$. Prove that:

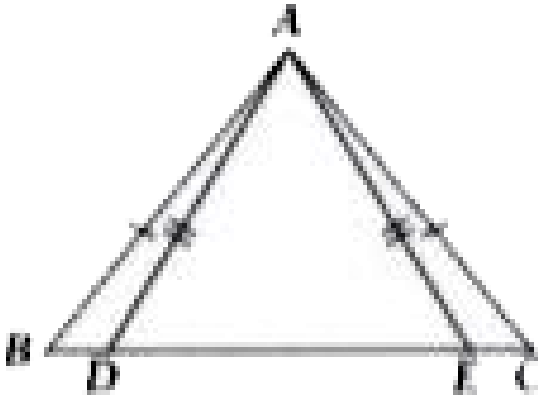
$$\triangle ABD \cong \triangle ACE$$



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20. In the given figure, $AB = AC$ and $AD = AE$. Prove that:

$BD = CE$



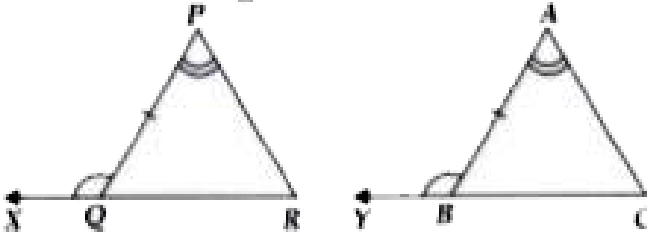
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21. AB is a line segment. AX and BY are two equal line segments drawn on opposite sides of line AB such that $AX \parallel BY$. If AB and XY intersect each other at P , prove that $APX \cong BPY$

(ii) AB and XY bisect each other.

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22. Show that the given triangles are congruent.

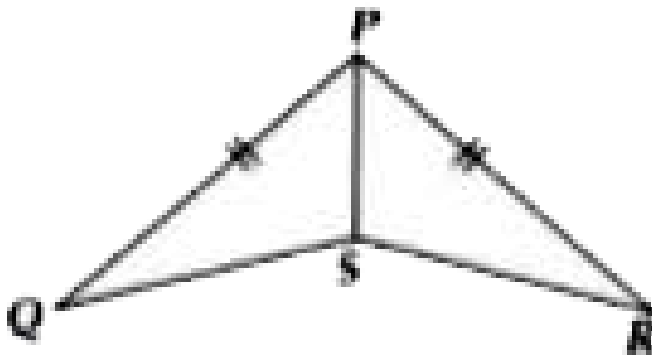


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23. If the diagonals of a quadrilateral bisect each other; then the quadrilateral is a parallelogram.


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24. In the given figure, if S is the angle bisector of $\angle QPR$ then, show that $\triangle PQS \cong \triangle PRS$.





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Ncert Section Exercise 7.1

1. Complete the following statements: (a) Two line segments are congruent if _____. (b) Among two congruent angles, one has a measure of $\{70^\circ\}$ 

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2. Complete the following statements: (a) Two line segments are congruent if _____. (b) Among two congruent angles, one has a measure of  $\{70^\circ\}$ 

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3. Complete the following statements: (a) Two line segments are congruent if _____. (b) Among two congruent angles, one has a measure of  $\{70^\circ\}$ 

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4. Give any two real-life examples for congruent shapes.

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5. If  $\Delta ABC \cong \Delta FED$ 

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6.1  \Delta DEF \cong \Delta BCA 

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7.1  \Delta DEF \cong \Delta BCA 

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8.1  \Delta DEF \cong \Delta BCA 

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9.1  \Delta DEF \cong \Delta BCA 

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1. Which congruence criterion do you use in the following? (a) Given:



$$AC = DF$$



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2. Which congruence criterion do you use in the following? (a) Given:



$$AC = DF$$



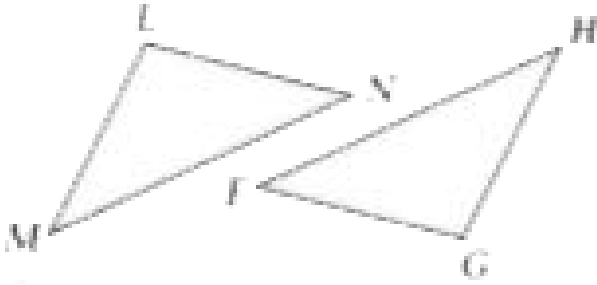
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3. Which congruence criterion do you use in the following?

$$\text{Given: } \angle MLN = \angle FGH, \angle NML = \angle HFG,$$

$$ML = FG$$

So, $\triangle LMN \cong \triangle GFH$



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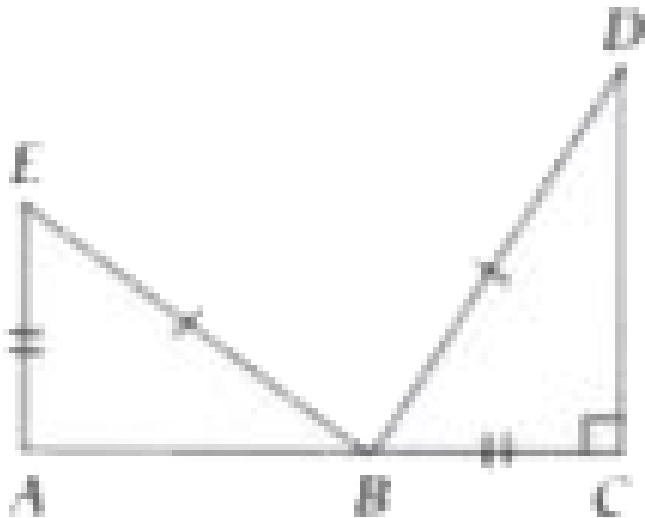
4. Which congruence criterion do you use in the following?

Given: $EB = BD$,

$AE = CB$,

$\angle A = \angle C = 90^\circ$.

So, $\triangle ABE \cong \triangle CDB$



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5. You want to show that $\triangle ART \cong \triangle PEN$,

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6. You want to show that $\triangle ART \cong \triangle PEN$,



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7. You want to show that  \Delta ART \cong \Delta PEN,



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8. You want to show that  \Delta ART \cong \Delta PEN,



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9. You want to show that  \Delta ART \cong \Delta PEN,



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10. You want to show that  \Delta ART \cong \Delta PEN,



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11. You want to show that  $\Delta ART \cong \Delta PEN$,

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12. You have to show that . In the following proof, supply the missing reasons

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13. In  ΔABC 

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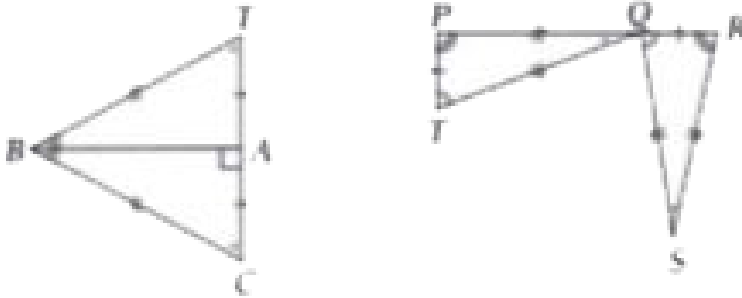
14. In the figure, the two triangles are congruent. We can write

$\Delta RAT \cong ?$



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15. Complete the congruent statement:



$\triangle BCA \cong ? \triangle QRS \cong ?$

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16. If the area of two similar triangles are equal then the triangles are congruent.

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17. In a squared sheet, draw two triangles of equal areas such that (i) the triangles are congruent. (ii) the triangles are not congruent. What can you say about their perimeters?

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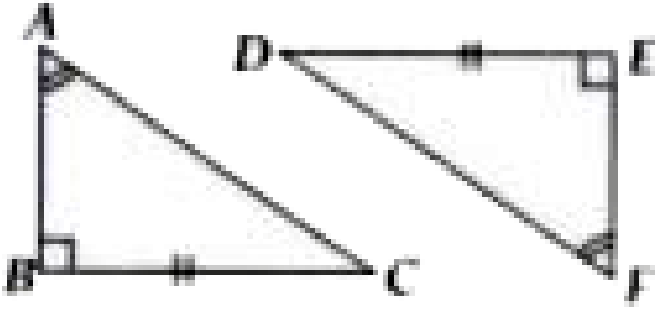
18. Draw a rough sketch of two triangles such that they have five pairs of congruent parts but still the triangles are not congruent.

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19. If  ΔABC 

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20. Explain, why $\triangle ABC \cong \triangle FED$



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Exercise Multiple Choice Questions Level 1

1. If hypotenuse and an acute angle of one right triangle are equal to the hypotenuse and an acute angle of another right triangle, then the triangles are congruent

A. ASA

B. SSS

C. SAS

D. RHS

Answer: D



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2. Angle Angle Side (AAS) Congruence - If any two angles and a non-included side of one triangle are equal to the corresponding angles and side of another triangle; the two triangles are congruent.

A. SSS

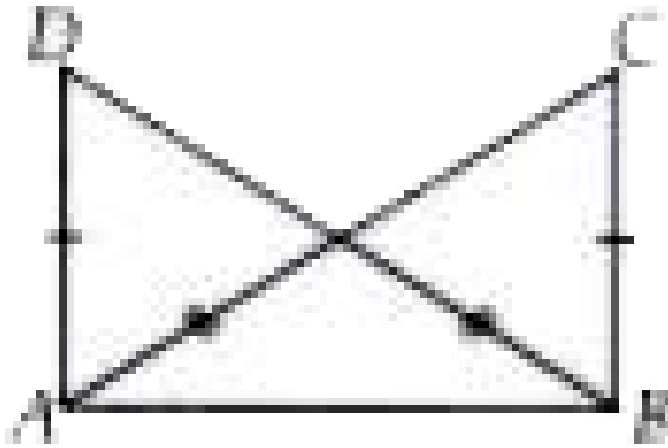
B. RHS

C. SAS

D. ASA

Answer: D

3. If $AC = BD$, $AD = BC$, then which of the following statements is meaningfully written?



- A. $\triangle ABC \cong \triangle ABD$
- B. $\triangle ABC \cong \triangle BAD$
- C. $\triangle ABC \cong \triangle BDA$
- D. $\triangle ABC \cong \triangle ADB$

Answer: B



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4. Theorem 7.4 (SSS congruence rule) : If three sides of one triangle are equal to the three sides of another triangle, then the two triangles are congruent.

A. SAS

B. SSS

C. RHS

D. ASA

Answer: B



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5. Which angle is included between the side DE and EF of $\triangle DEF$?

A. $\angle D$

B. $\angle E$

C. $\angle F$

D. can't be determined

Answer: B



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6.

Ankita wants to prove $\triangle ABC \cong \triangle DEF$ using *SAS*. She knows

$AB = DE$ and $AC = DF$

.What additional piece of information does she need ?

A. $\angle P = \angle D$

B. $\angle Q = \angle D$

C. $\angle P = \angle F$

D. $\angle R = \angle F$

Answer: C

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7. Which congruence criterion do you use in the following? (a) Given:



AC = DF

- A. ASA rule
- B. SAS rule
- C. RHS rule
- D. SSS rule

Answer: D

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8. By applying ASA congruence rule, it is to be established that



$\Delta ABC \cong \Delta QRP$

- $DF = MN$
- $DF = MP$
- $DE = MN$
- None of these

Answer: B



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9. Which congruence criterion do you use in the following? (a) Given:



$AC = DF$

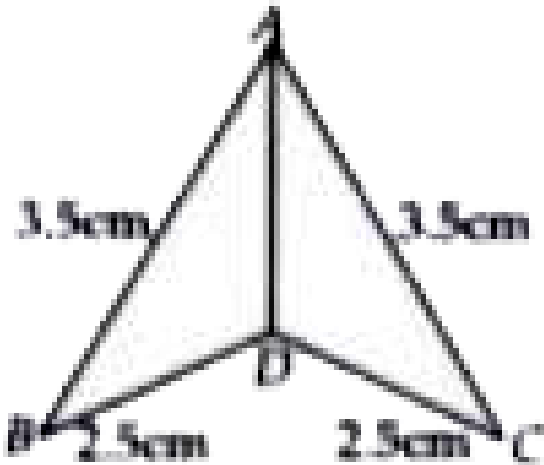
- A. SAS rule
- B. SSS rule
- C. ASA rule
- D. RHS rule

Answer: D



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10. By which rule $\triangle ABD \cong \triangle ACD$



A. SSS

B. ASA

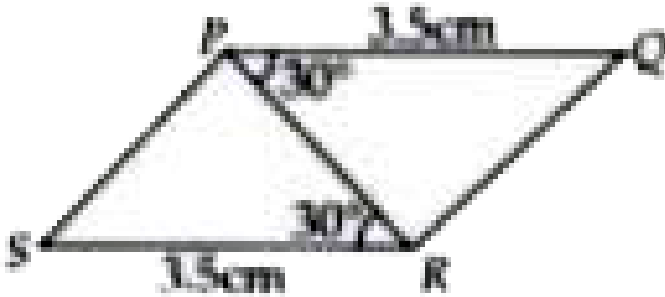
C. SAS

D. RHS

Answer: A

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11. By which rule $\triangle PQR \cong \triangle RSP$

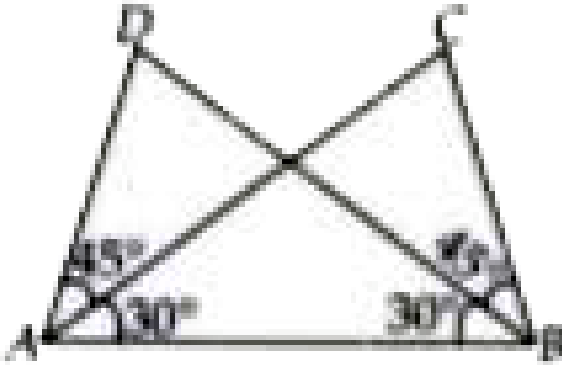


- A. SSS
- B. ASA
- C. SAS
- D. RHS

Answer: C

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12. By which rule $\triangle ABD \cong \triangle BAC$



A. SSS

B. ASA

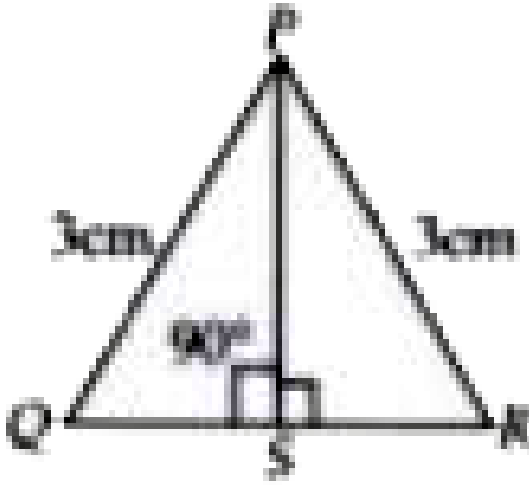
C. SAS

D. RHS

Answer: B

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13. By which rule is $\triangle PSQ \cong \triangle PSR$.



A. SSS

B. ASA

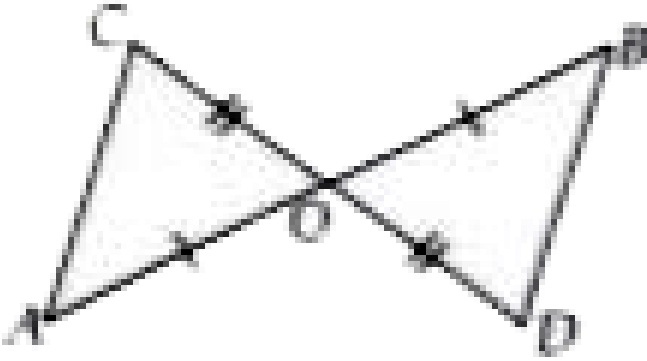
C. SAS

D. RHS

Answer: D

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14. In the given figure, If AB and CD bisect each other at O, then $\triangle AOC$ is congruent to



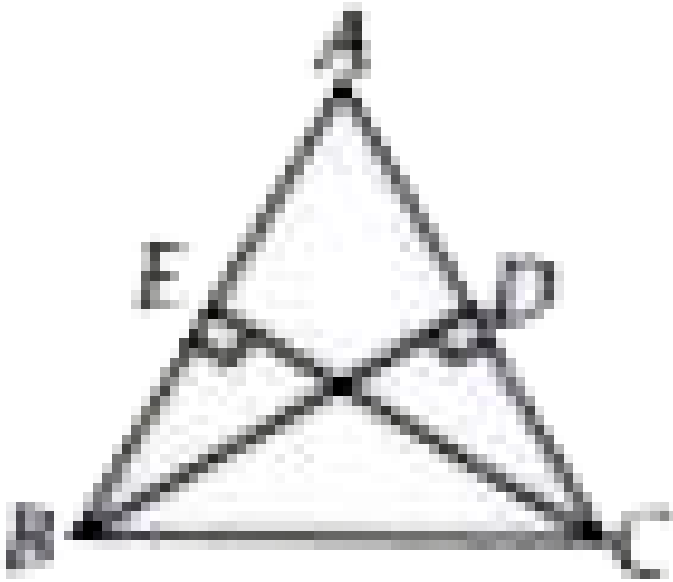
- A. $\triangle BOD$
- B. $\triangle DOB$
- C. $\triangle DOB$
- D. $\triangle BDO$

Answer: A



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15. In the given figure, BD and CE are the altitudes of triangle ABC such that $BD = CE$, then



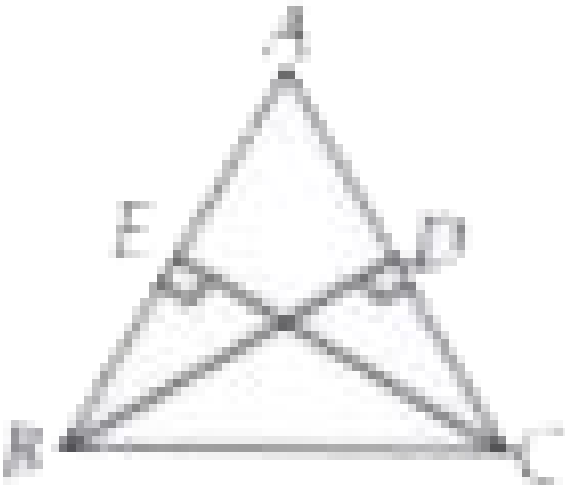
$\triangle CBD$ is congruent to

- A. $\triangle CBE$
- B. $\triangle BCE$
- C. $\triangle BEC$
- D. $\triangle ECB$

Answer: B

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16. In the given figure, BD and CE are the altitudes of triangle ABC such that $BD = CE$, then



$\angle DCB =$

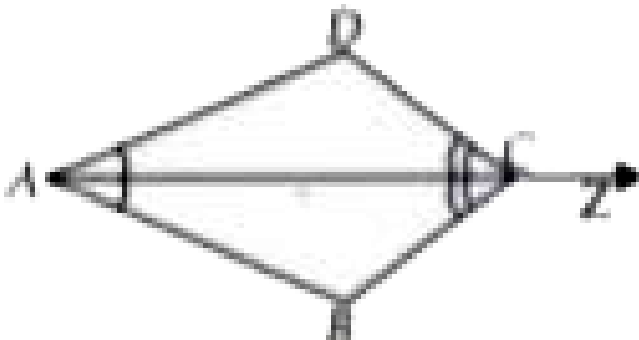
- A. $\angle EBC$
- B. $\angle ECB$
- C. $\angle ABD$

D. $\angle DBC$

Answer: A

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17. In the given figure, if ray Az bisects $\angle BAD$ and $\angle DCB$, then $\triangle BAC$ is congruent to



A. $\triangle ADC$

B. $\triangle DCA$

C. $\triangle DAC$

D. $\triangle ACD$

Answer: C



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18. If for $\triangle ABC$ and $\triangle DEF$, the correspondence $CAB \leftrightarrow EDF$ gives a congruence, then which of the following is not true?

A. $AC = DE$

B. $AB = EF$

C. $\angle A = \angle D$

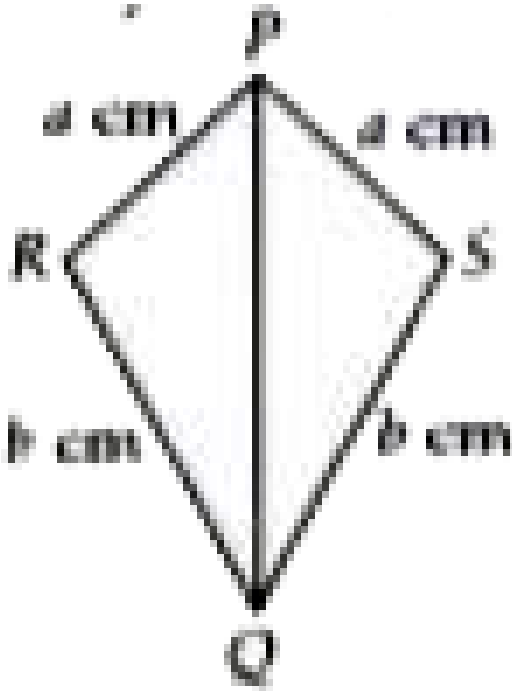
D. $\angle C = \angle E$

Answer: B



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19. By which congruency criterion, $\Delta PQR \cong \Delta PQS$



A. RHS

B. ASA

C. SSS

D. SAS

Answer: C



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20. Which of the following is not a criterion for congruence of triangle ?

A. AAA

B. SSS

C. SAS

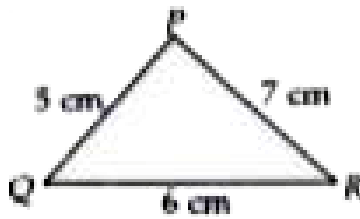
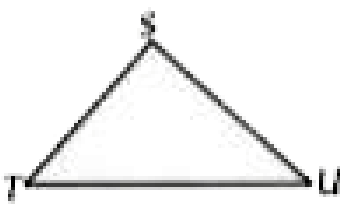
D. ASA

Answer: A



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21. If $\triangle PQR$ is congruent to $\triangle STU$ in the given figure, then what is the length of TU?



- A. 5 cm
- B. 6 cm
- C. 7 cm
- D. can't be determined

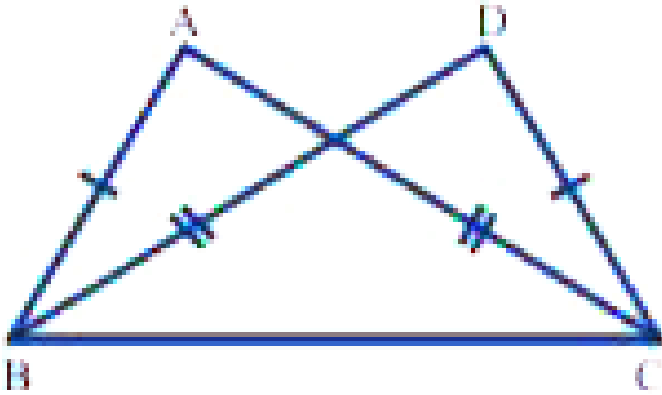
Answer: B



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22. If $\triangle ABC$ and $\triangle DBC$ are on the same base BC, $AB = DC$ and $AC = DB$ (Fig. 6.21), then which of the following gives a congruence

relationship?



A. $\triangle ABC \cong \triangle DBC$

B. $\triangle ABC \cong \triangle CBD$

C. $\triangle ABC \cong \triangle DCB$

D. $\triangle ABC \cong \triangle BCD$

Answer: C

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23. If $\triangle ABC \cong \triangle PRQ$, then $\angle B$ and PQ are respectively equal to

A. $\angle P$ and AC

B. $\angle R$ and BC

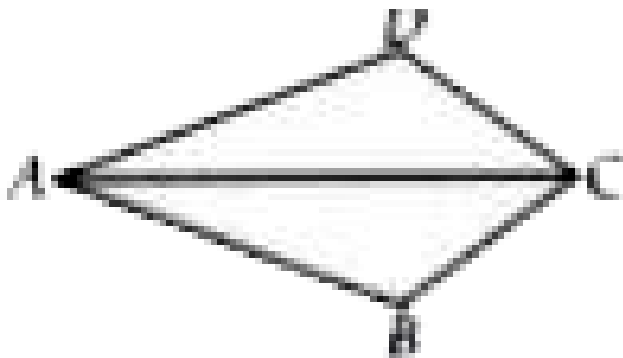
C. $\angle R$ and AC

D. $\angle Q$ and AB

Answer: C

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24. In the adjoining figure, if $AB = AD$ and $CB = CD$, then which of the following is correct?



A. $\triangle ABC \cong \triangle ADC$

B. $\angle BCA = \angle DCA$

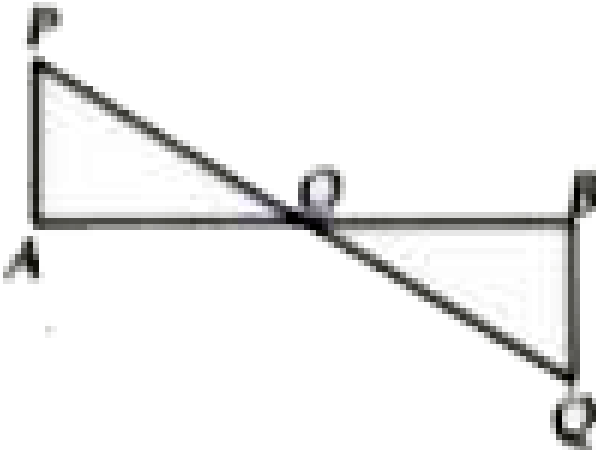
C. $\angle ADC = \angle ABC$

D. All of these

Answer: D

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25. In the given figure, if $\triangle OAP \cong \triangle OBQ$, then which of the following is not true?



A. $AO = BO$

B. $AP = BQ$

C. $PO = BO$

D. $\angle APO = \angle BQO$

Answer: C



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26. If $\triangle EFG \cong \triangle PQR$ and GE is the hypotenuse in $\triangle EFG$, then right angle in $\triangle PQR$ is

A. $\angle P$

B. $\angle Q$

C. $\angle R$

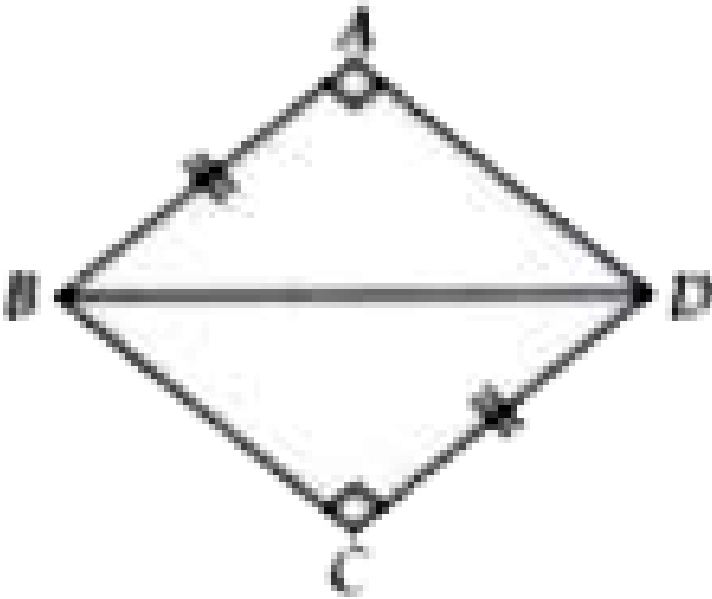
D. can't be determined

Answer: B



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27. In the given figure, $\angle A$ and $\angle C$ are right angles and $AB = CD$. Then $\angle BDC$ equals to



A. $\angle BCD$

B. $\angle ABD$

C. $\angle CBD$

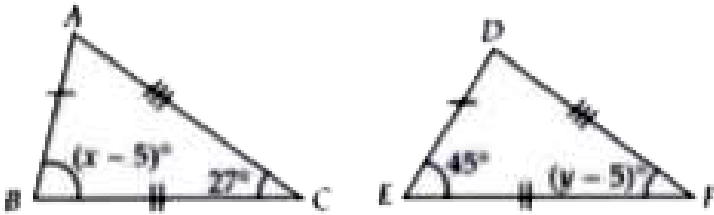
D. $\angle ADB$

Answer: B



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28. $\triangle ABC$ and $\triangle DEF$ are congruent triangles by SSS congruence condition. Find the value of x and y respectively.



A. $42^\circ, 25^\circ$

B. $32^\circ, 40^\circ$

C. $50^\circ, 32^\circ$

D. $45^\circ, 37^\circ$

Answer: C



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29. $\triangle ABC \cong \triangle XYZ$, $\angle A = 50^\circ$, $\angle B = 60^\circ$ then measure of $\angle Z$ is

A. 50°

B. 60°

C. 70°

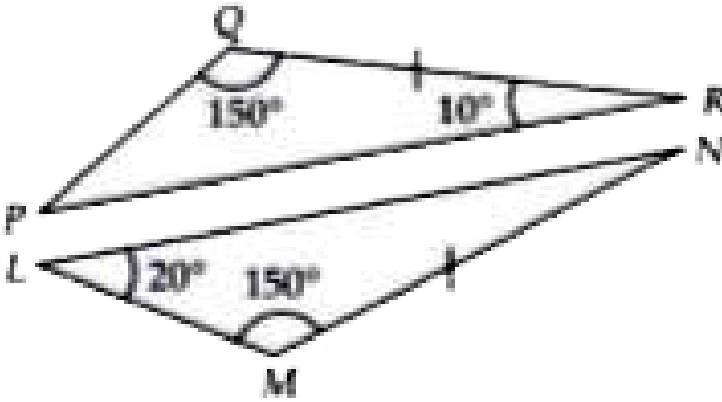
D. can't be determined

Answer: C



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30. In the given figure, $PQ = \underline{\hspace{2cm}}$.



A. MN

B. LM

C. LN

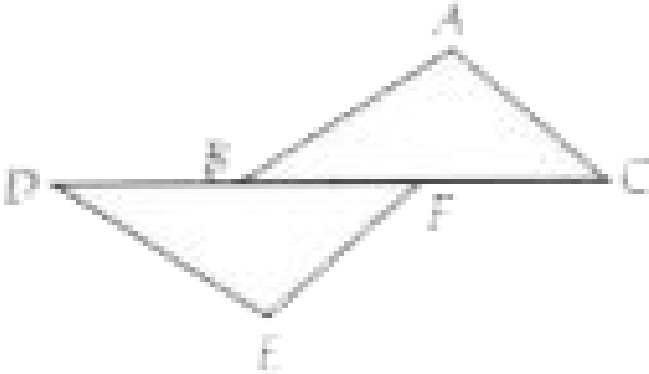
D. QR

Answer: B



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31. In the given figure, $\triangle DEF \cong \triangle CAB$. Which of the following is not correct?



A. $DE = CA$

B. $AB = DF$

C. $\angle ABC = \angle EFD$

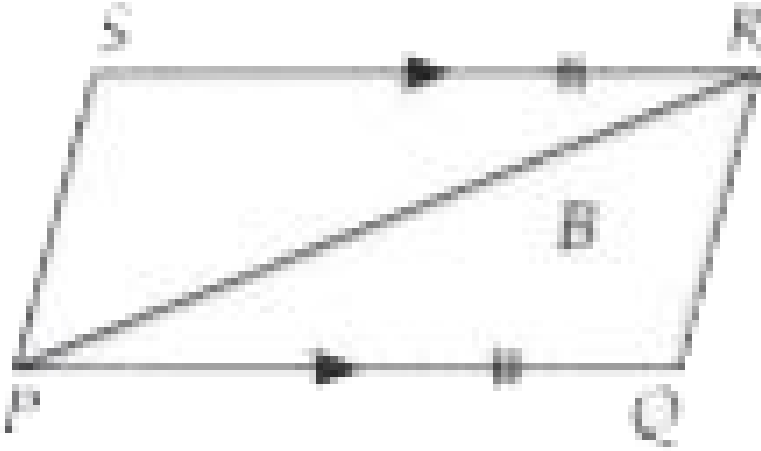
D. $DE \parallel AC$

Answer: B



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32. In the given figure, $PQ = SR$ and $PQ \parallel SR$. Then which of the following is true?



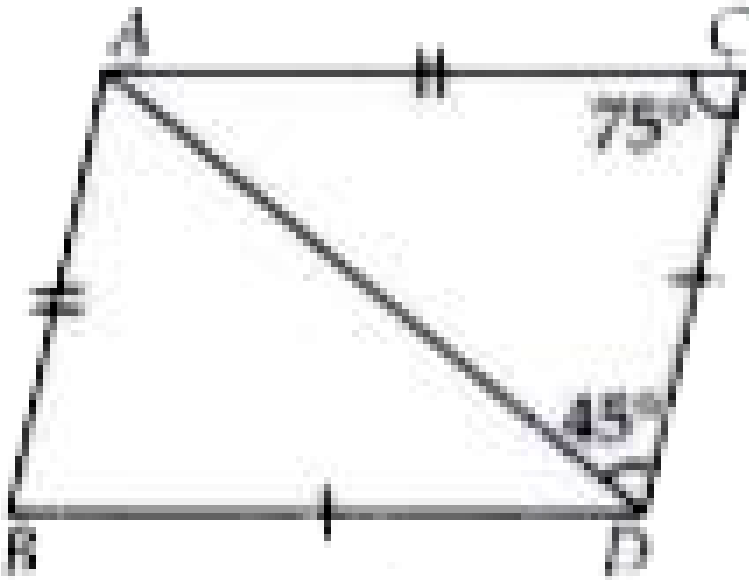
- A. $\triangle PQR \cong \triangle RSP$
- B. $\triangle PQR \cong \triangle SRP$
- C. $\triangle PQR \cong \triangle PRS$
- D. $\triangle PQR \cong \triangle PSR$

Answer: A



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33. In the figure, $\triangle ABD \cong \triangle ACD$, $\angle ACD = 75^\circ$ and $\angle ADC = 45^\circ$ then, $\angle ADB$ equals



- A. 40°
- B. 140°
- C. 45°

D. 75°

Answer: C



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34. $\triangle PRQ$ and $\triangle LMN$ are congruent in any correspondence. $PQ = 5$ cm, $PR = 4$ cm and $\angle P = 30^\circ$. If $LM = 5$ cm and $QR = MN$, then LN equals

A. 3 cm

B. 5 cm

C. 4 cm

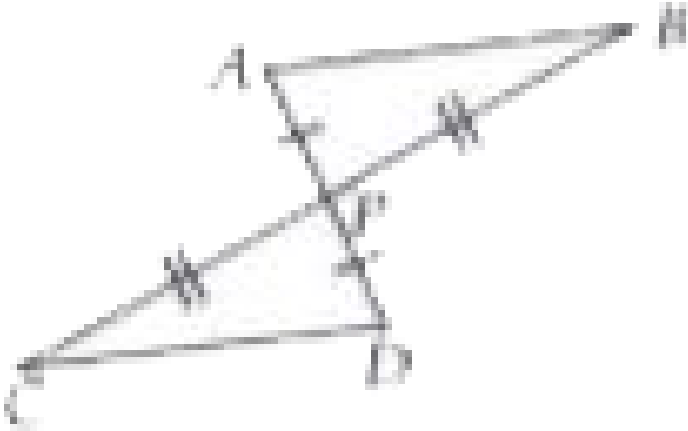
D. can't be determined

Answer: C



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35. Observe the figure and choose the correct relation from the following.



A. $\triangle APB \cong \triangle PDC$

B. $\triangle ABP \cong \triangle PCD$

C. $\angle ABP = \angle DCP$

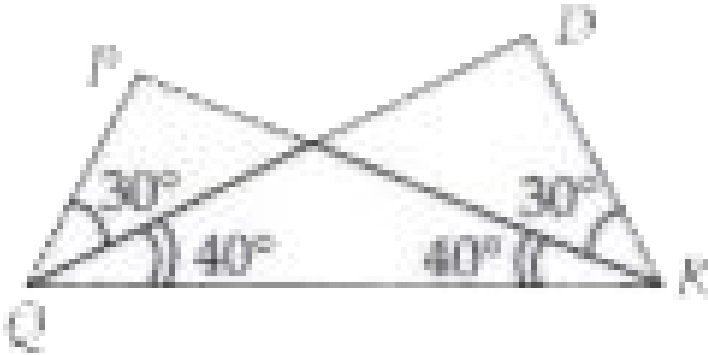
D. $\triangle APB \cong \triangle CPD$

Answer: C



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36. In the given figure, $\Delta \text{---} \cong \Delta PQR$



A. QRD

B. DRQ

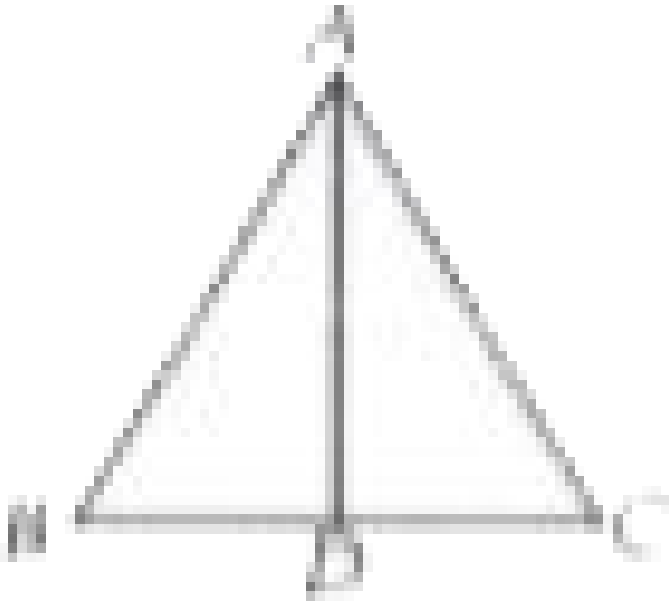
C. RQD

D. both (b) and (c)

Answer: B

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37. In the adjoining figure, if ABC is a triangle in which AD is the bisector of $\angle A$. If $AD \perp BC$, then



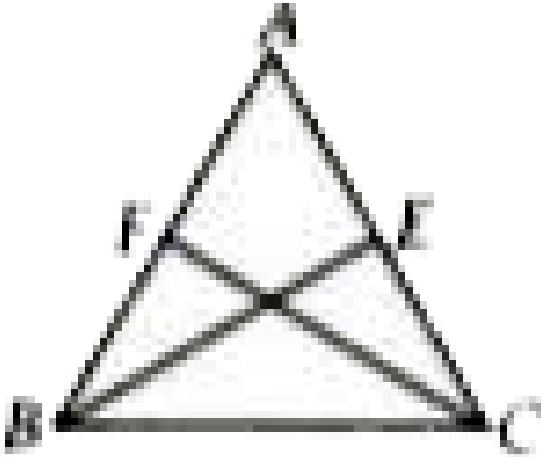
- A. $\triangle ABC$ is an isosceles triangle
- B. $\triangle ABC$ is an equilateral triangle
- C. $\triangle ABC$ is an scalene triangle
- D. $BD = AC$

Answer: A



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38. In the adjoining figure, ABC is an isosceles triangle in which $AB = AC$. If E and F be the midpoints of AC and AB respectively, then



A. $BE = CF$

B. $\angle BFC = \angle CEB$

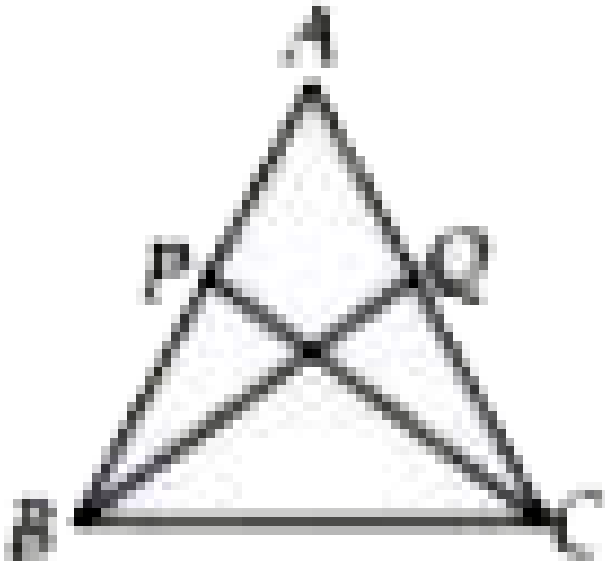
C. $BF = CE$

D. All of these

Answer: D

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39. In the adjoining figure, P and Q are two points on equal sides AB and AC of an isosceles triangle ABC such that $AP = AQ$, then



A. $BQ = CP$

B. $\angle ABQ = \angle ACP$

C. $\angle BAQ = \angle CPA$

D. both (a) and (b)

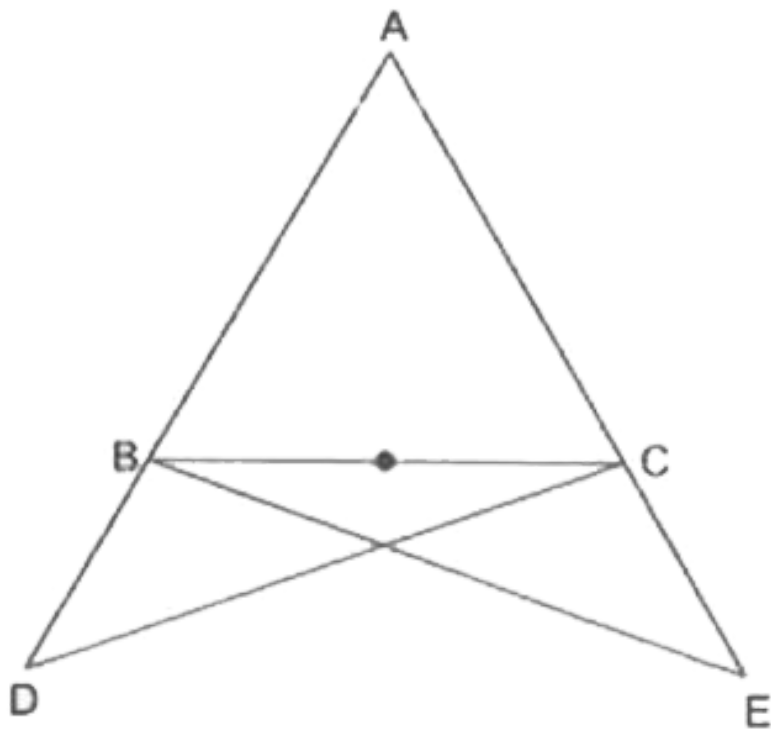
Answer: D



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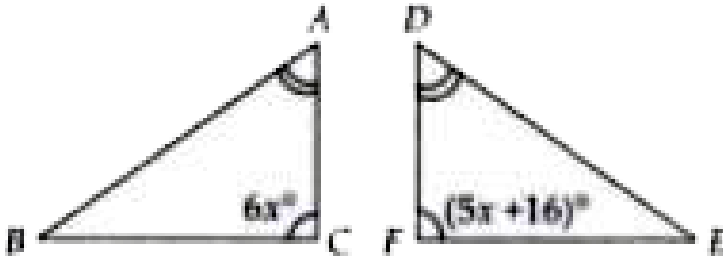
40. In the given figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$. If AB and AC are produced to D and E respectively such that $BD = CE$.

CE, prove that $BE = CD$. Hint. Show that $\triangle ACD = \triangle ABE$.



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41. If $\triangle ACB \cong \triangle DFE$, then find the measure of $\angle F$.



- A. 4°
- B. 96°
- C. 100°
- D. 60°

Answer: B

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42. If ABCD is a square, X is the mid point of AB and Y is the mid point of BC, then which of the following is NOT correct?

A. $\triangle ADX \cong \triangle BAY$

B. $\angle DXA = \angle AYB$

C. $\angle ADX = \angle BAY$

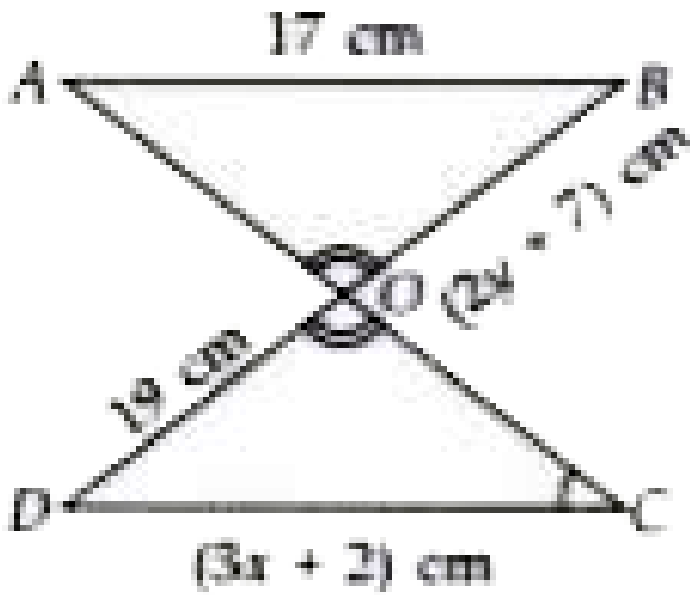
D. $DX = BY$

Answer: D



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43. In the given figure, $\triangle ABO$ and $\triangle CDO$ are congruent. The value of x and y are



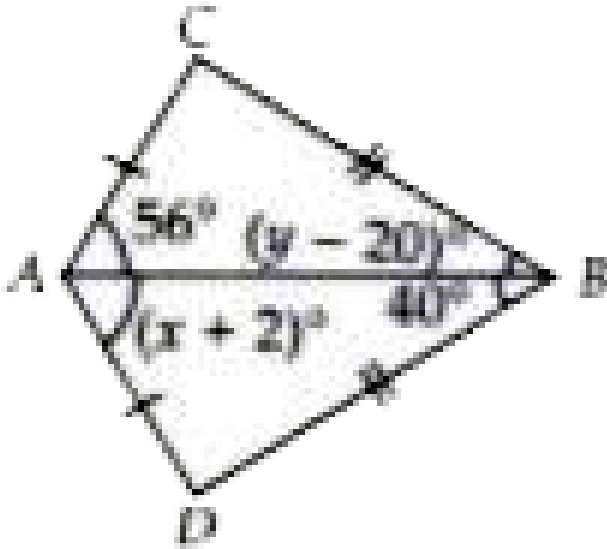
- A. 15 cm, 12 cm
- B. 10 cm, 8 cm
- C. 5 cm, 6 cm
- D. 6 cm, 5 cm

Answer: C



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44. Find the value of x and y respectively in the given figure.



A. $58^\circ, 76^\circ$

B. $54^\circ, 60^\circ$

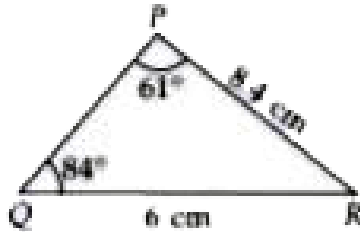
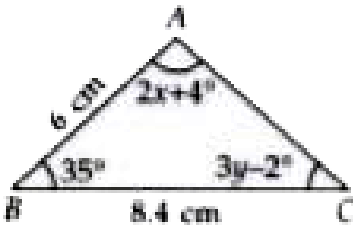
C. $38^\circ, 20^\circ$

D. $42^\circ, 36^\circ$

Answer: B

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45. Find the value of x and y respectively, if $\triangle ABC \cong \triangle QRP$.



A. $15^\circ, 30^\circ$

B. $21^\circ, 40^\circ$

C. $30^\circ, 15^\circ$

D. $40^\circ, 21^\circ$

Answer: D

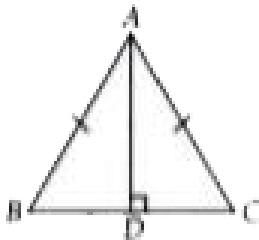
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Match The Following

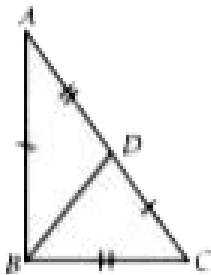
1. Match the figures in List I, with their corresponding congruence criterion in List II.

List-I

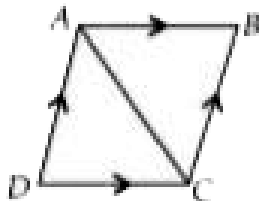
(P)



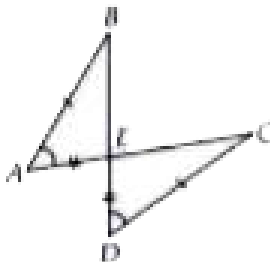
(Q)



(R)



(S)



List-II

(1) ASA congruency

(2) RHS congruency

(3) SSS congruency

(4) SAS congruency

A. P-2, Q-4, R-1, S-3

B. P-3, Q-1, R-2, S-4

C. P-2, Q-3, R-1, S-4

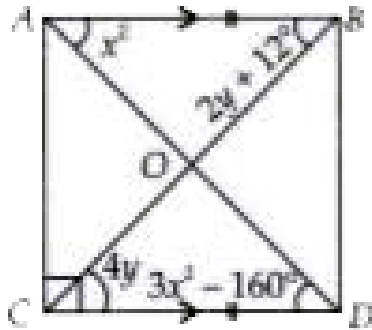
D. P-3, Q-4, R-2, S-1

Answer: C



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2. Match the following using the adjoining figure in which $\triangle AOB \cong \triangle DOC$.



List-I

- (P) $\angle AOB =$
- (Q) $\angle ODC =$
- (R) $\angle OCD =$
- (S) $\angle OCA =$

List-II

- (1) 80°
- (2) 24°
- (3) 66°
- (4) 76°

A. P-4, Q-3, R-2, S-1

B. P-4, Q-1, R-2, S-3

C. P-3, Q-2, R-1, S-4

D. P-3, Q-4, R-1, S-2

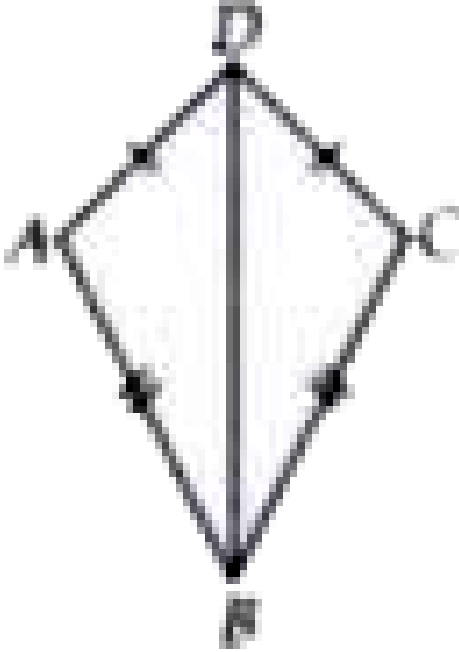
Answer: B



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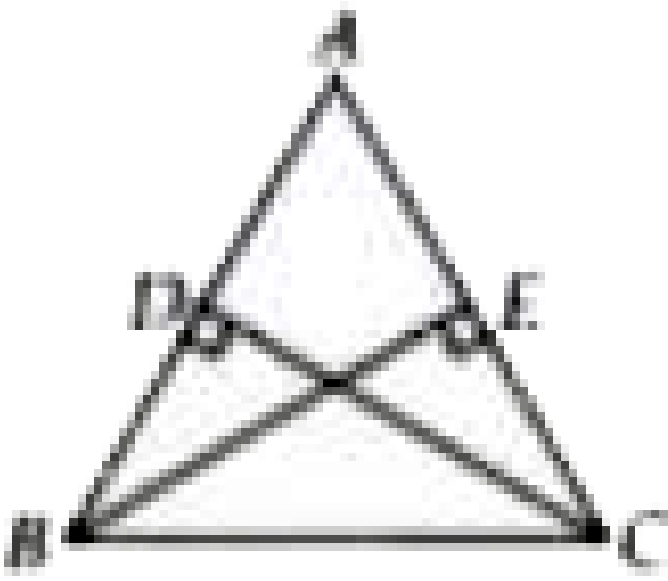
Assertion Reaction Type

1. In the given figure, $AD = DC$ & $AB = BC$, then prove that $\triangle ABD \cong \triangle CBD$.



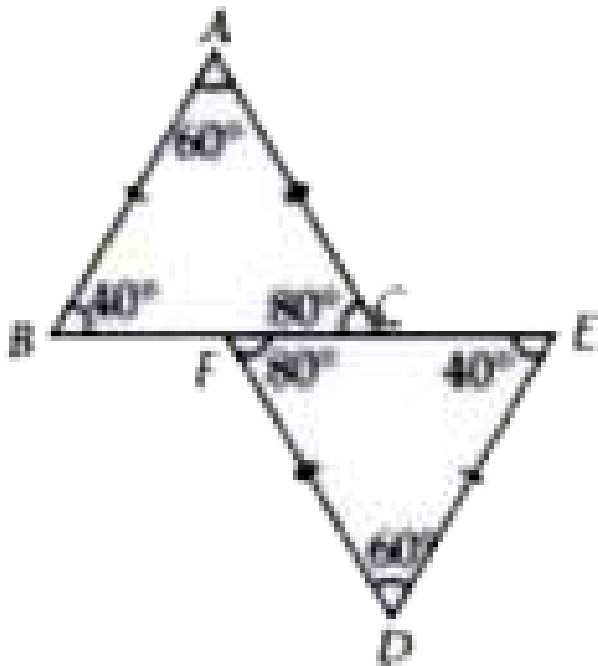
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2. In the given figure, $CD \perp AB$, $BE \perp AC$ and $CD = BE$, then prove that $\angle BCE = \angle CBD$.



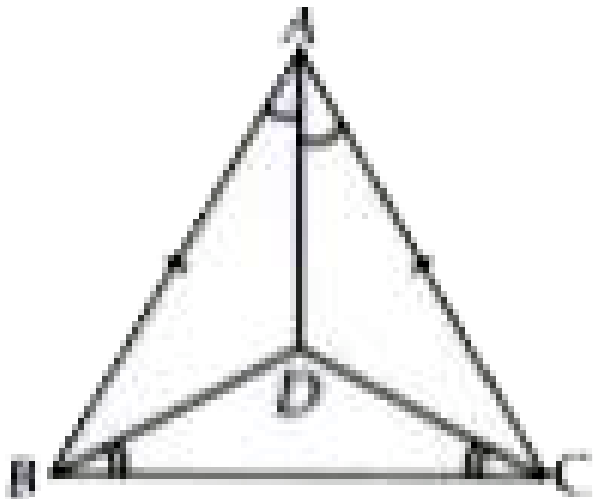
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3. In the given figure, $\triangle ABC \cong ?$



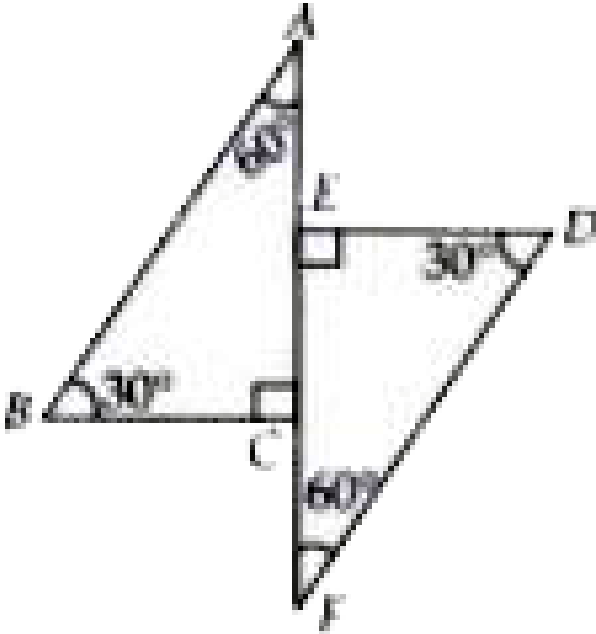
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4. In the adjoining figure, prove that $\triangle ABD \cong \triangle ACD$,



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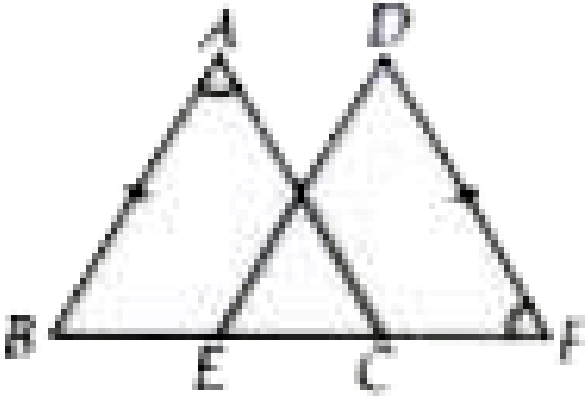
5. In the adjoining figure, $BC = ED$, then, prove that $\triangle ABC \cong \triangle FDE$.



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Comprehension Type

1. In given figure, $FE = AC$, $\triangle ABC \cong$ ____.



A. $\triangle DEF$

B. $\triangle FDE$

C. $\triangle DFE$

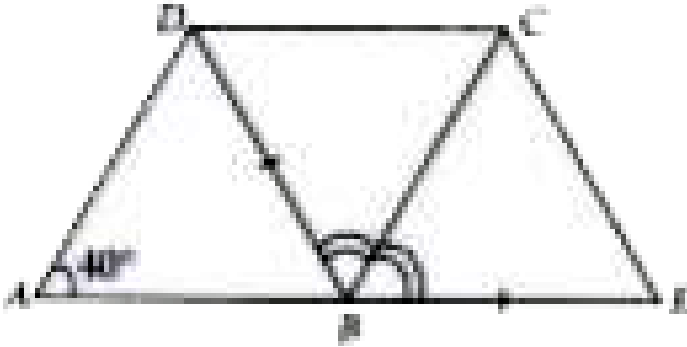
D. $\triangle FED$

Answer: B



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2. In the adjoining figure, ABCD is a parallelogram. find the measure of $\angle BCE$.

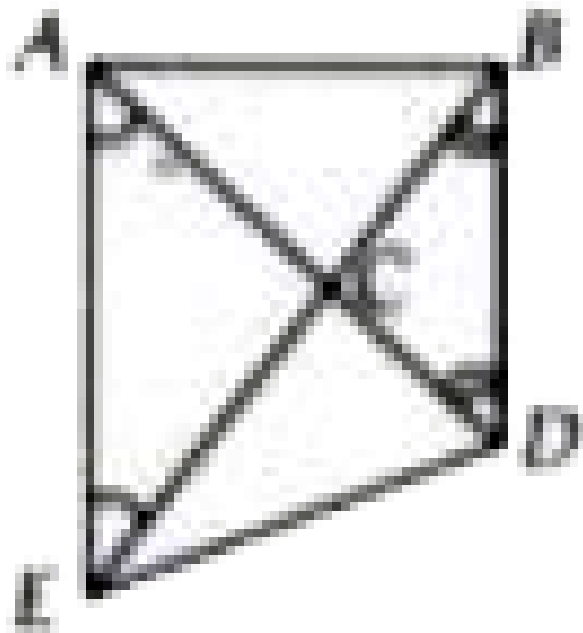


- A. 40°
- B. 140°
- C. 60°
- D. 80°

Answer: A

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3. In the given figure, $\triangle ACB$ is congruent to



A. $\triangle ECD$

B. $\triangle DCE$

C. $\triangle ACE$

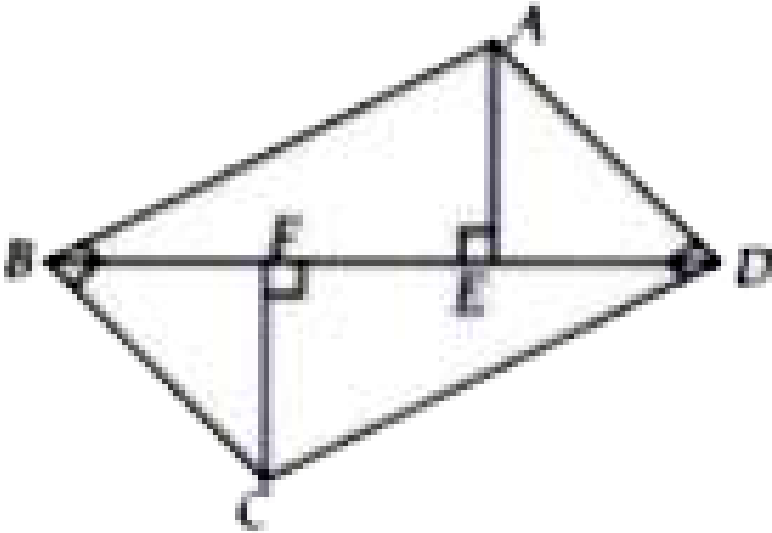
D. $\triangle BCD$

Answer: A



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4. CF and AE are equal perpendiculars on BD, BF = FE = ED



ABCD is a

A. Rectangle

B. Square

C. Rhombus

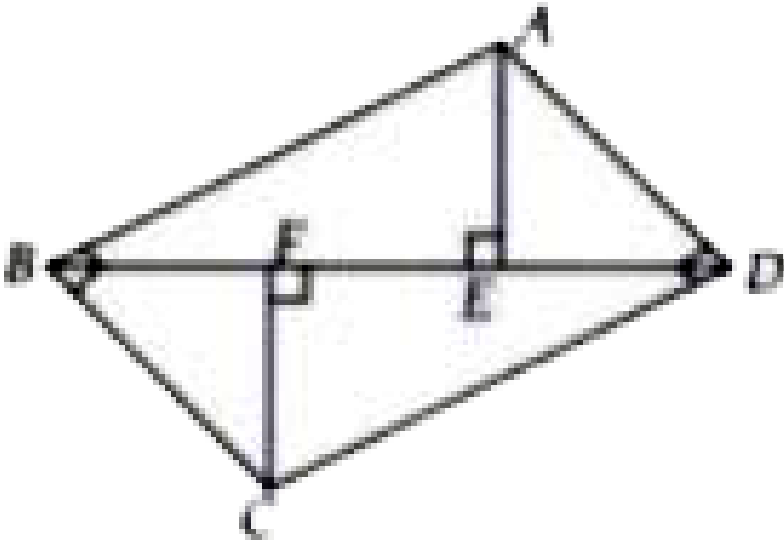
D. Kite

Answer: A



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5. CF and AE are equal perpendiculars on BD , $BF = FE = ED$



$\triangle ABE$ is congruent to

A. $\triangle AED$

B. $\triangle BFC$

C. $\triangle CDF$

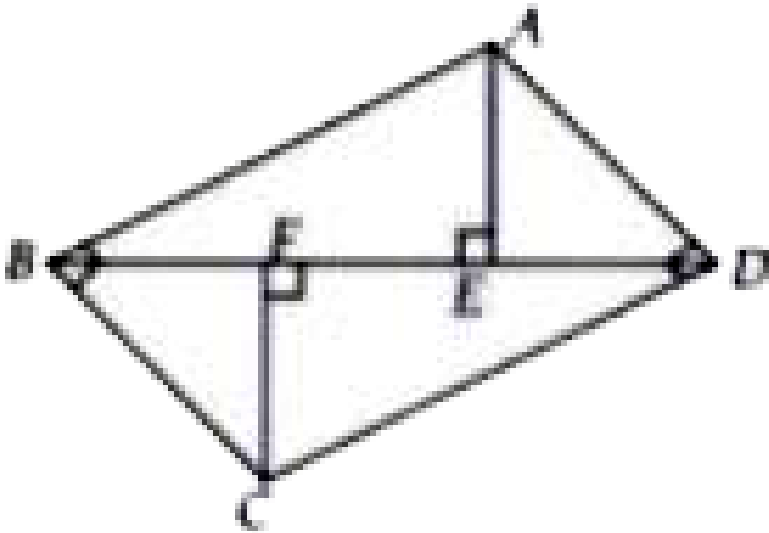
D. $\triangle BCD$

Answer: C



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6. CF and AE are equal perpendiculars on BD, BF = FE = ED



$\angle BAE = \underline{\hspace{2cm}}$.

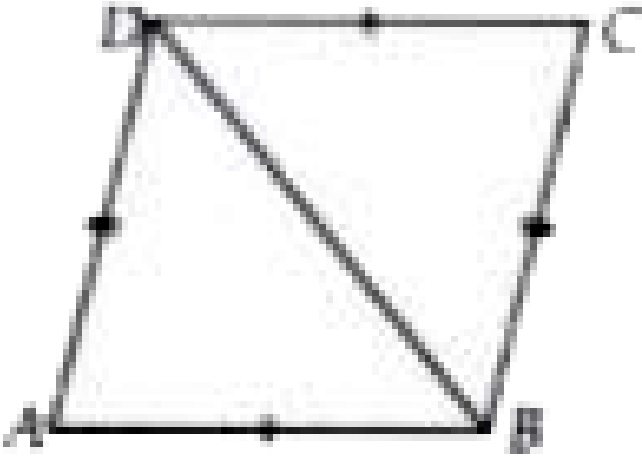
- A. $\angle BCD$
- B. $\angle CBA$
- C. $\angle ADC$
- D. $\angle DCF$

Answer: D

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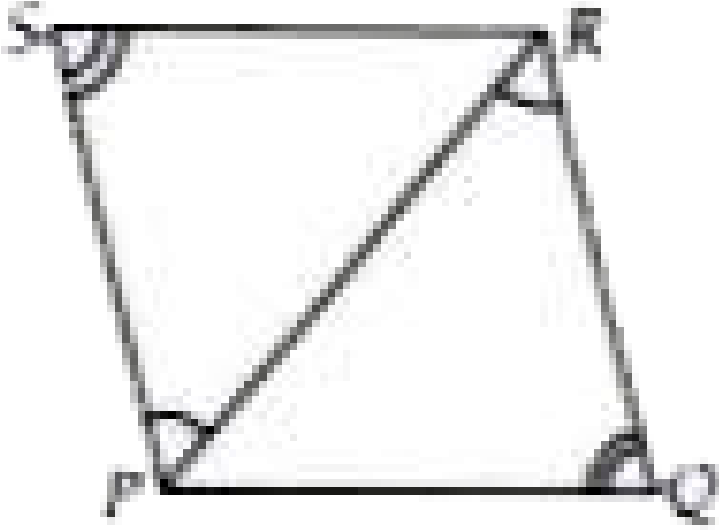
Subjective Problems Very Short Answer Type

1. In the given figure, $AB = CD$ and $AD = CB$. Prove that $\triangle ABD \cong \triangle CDB$.



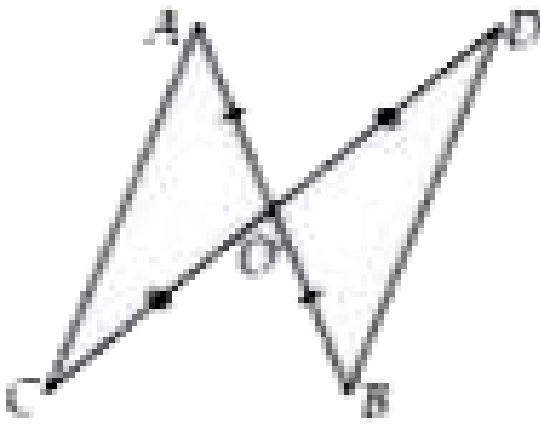
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2. In the given figure, $\angle SPR = \angle QRP$ and $\angle RSP = \angle PQR$. Prove that $PQ = RS$.



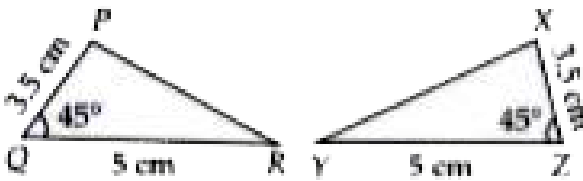
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3. In the given figure, we have $AO = BO$ and $CO = DO$. Prove that $\triangle AOC \cong \triangle BOD$.



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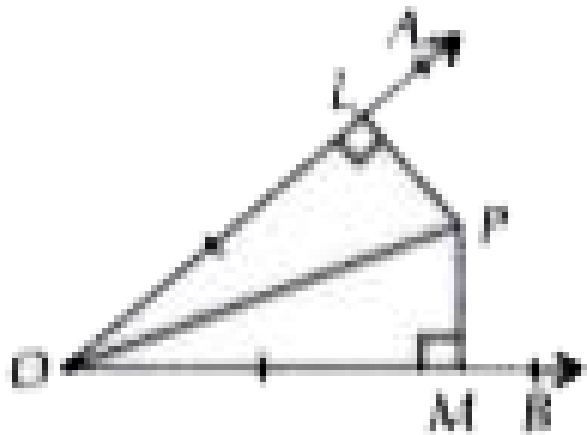
4. In the given figure, $\triangle PQR \cong \triangle$ ___



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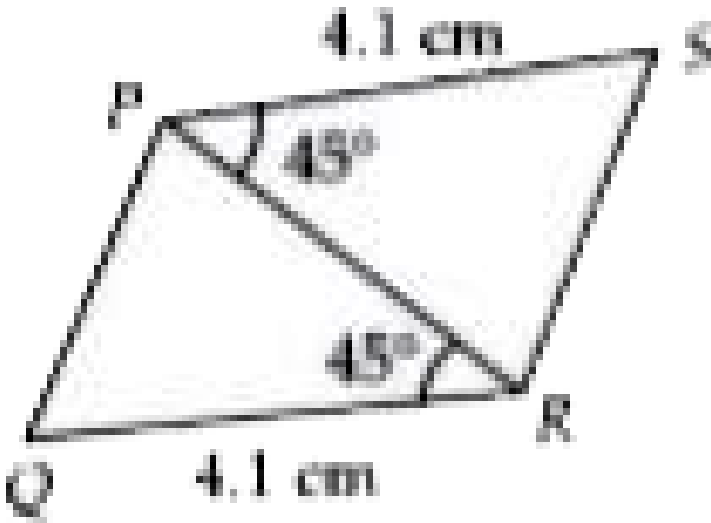
5. In the given figure, $PL \perp OA$ and $PM \perp OB$ such that $OL = OM$.

Prove that $\triangle OLP \cong \triangle OMP$.



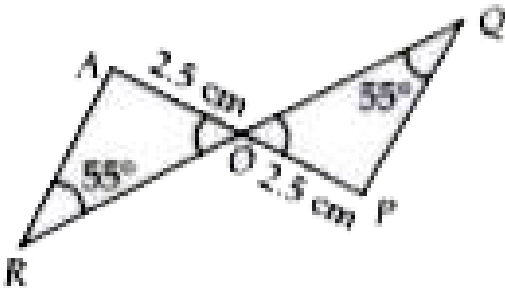
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6. In the given figure, $\Delta PQR \cong \Delta$ ___



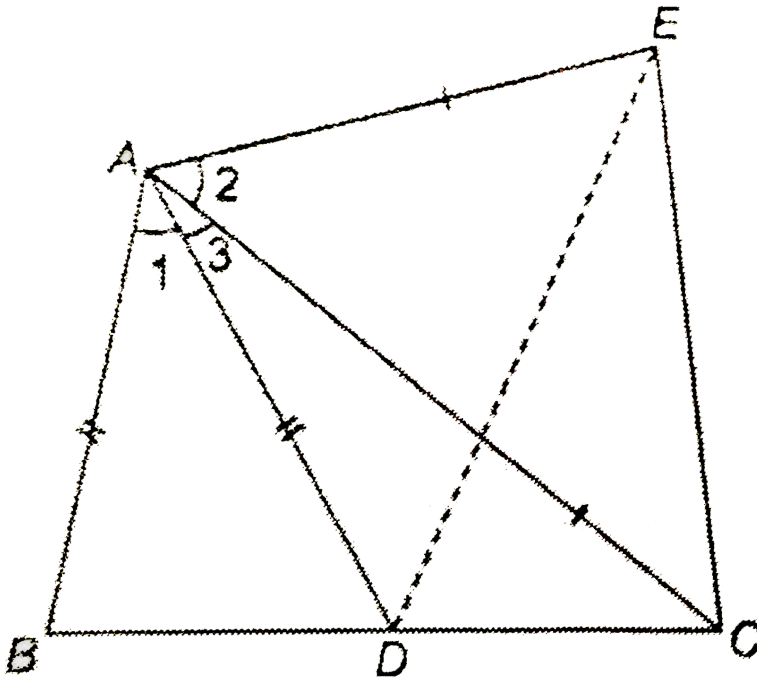
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7. In the given figure, $\Delta ARO \cong \Delta$ ___

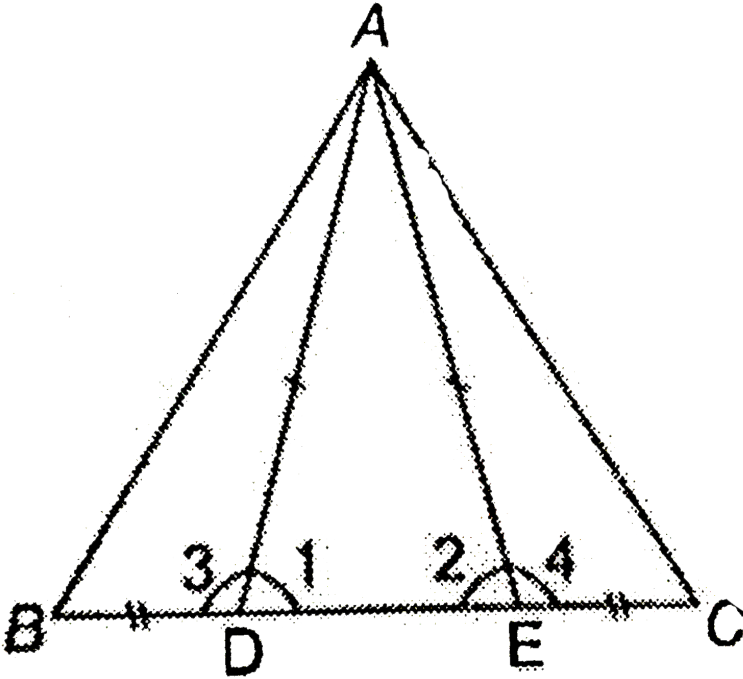


8. In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$.

Prove that $BC = DE$.



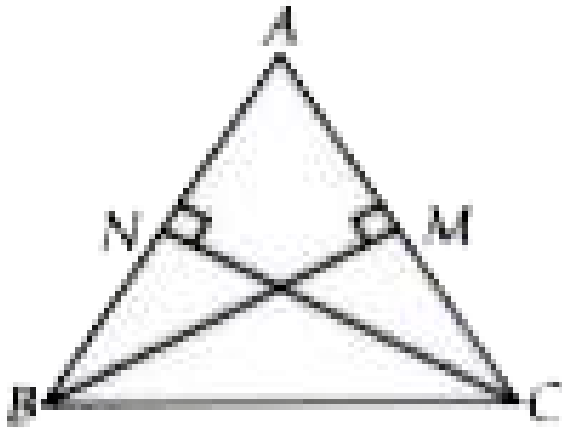
9. In the given figure, D and E are the points on the base BC of $\triangle ABC$ such that $BD = CE$, $AD = AE$ and $\angle ADE = \angle AED$, prove that $\triangle ADB \cong \triangle AEC$.



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10. $\triangle ABC$ is an isosceles triangle in which $AB = AC$. $BM \perp AC$ and $CN \perp AB$. If $AN = AM$, then Prove that

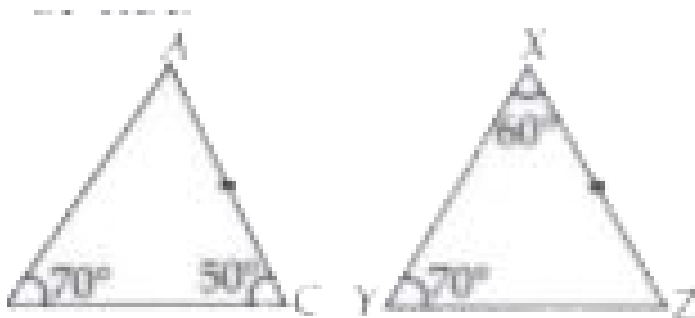
$$\Delta BMA \cong \Delta CNA.$$



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Subjective Problems Short Answer Type

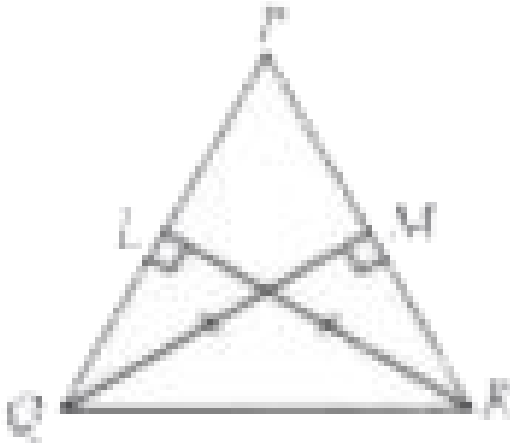
1. State whether the following triangles are congruent or not.





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2. Study the given and prove that $\triangle PQR$ is an isosceles triangle.



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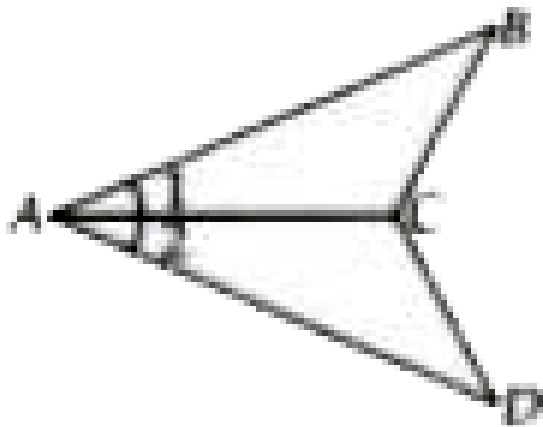
3. In Figure, it is given that $LM = MN$, $QM = MR$, $ML \perp PQ$ and $MN \perp PR$. Prove that $PQ = PR$



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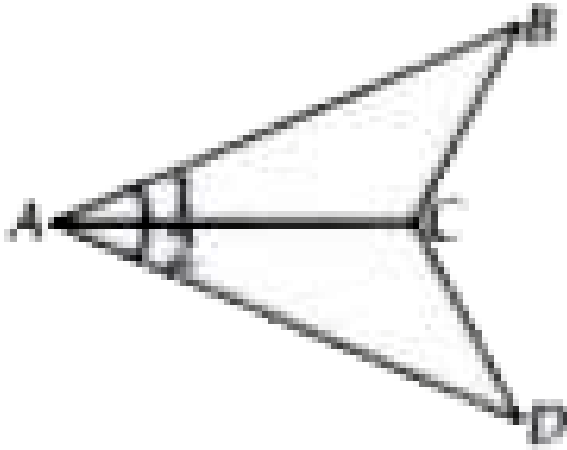
4. In the given figure, $AB = AD$ and $\angle 1 = \angle 2$. Prove that :

$$\triangle ABC \cong \triangle ADC$$



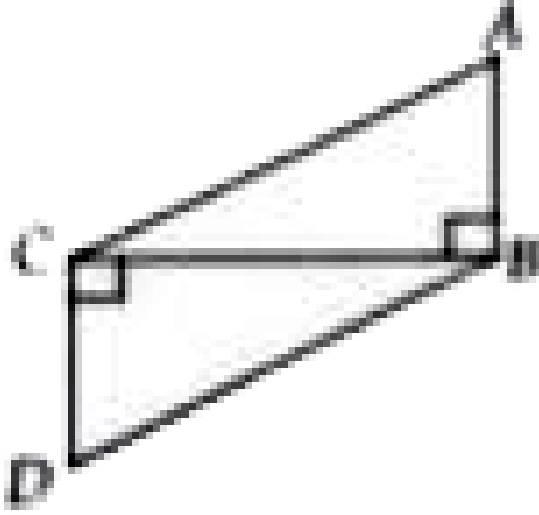
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5. In the given figure, $AB = AD$ and $\angle 1 = \angle 2$. Prove that : $BC = DC$



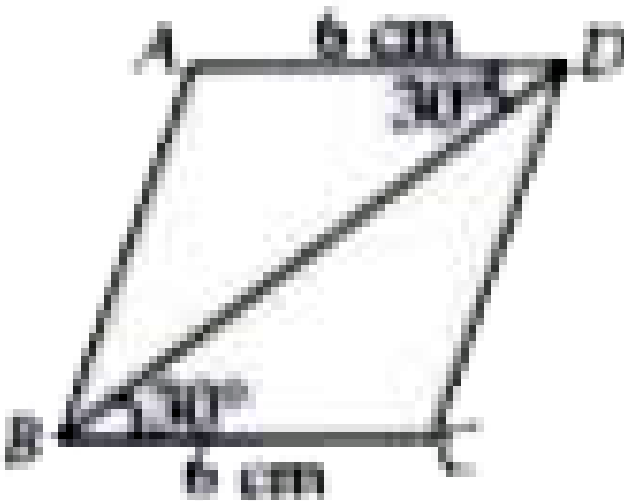
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6. In the given figure, $Ab = CD$ and $\angle ABC = \angle DCB = 90^\circ$. Prove that $AC = DB$.



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7. Prove that $\triangle ABD \cong \triangle CDB$.



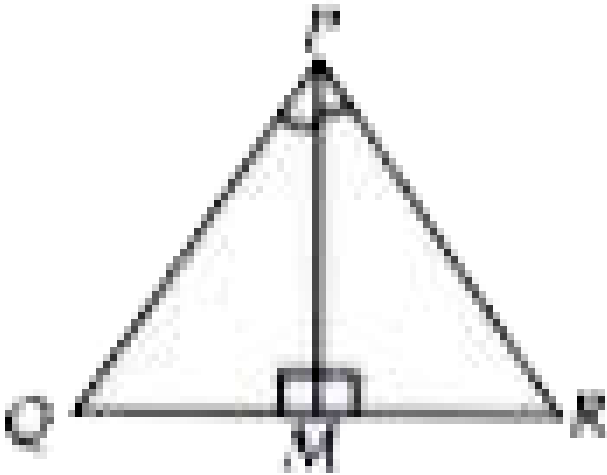


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8. PQR is a triangle in which PM is the bisector of $\angle P$ and $PM \perp QR$

. Prove that:

$$\Delta PMQ \cong \Delta PMR$$

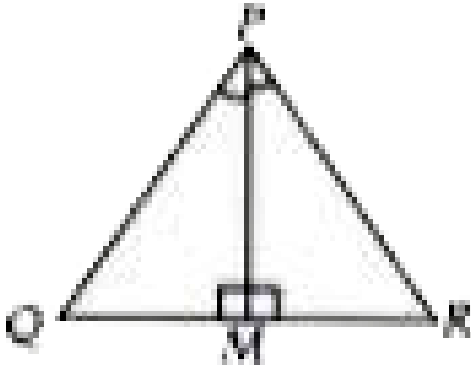


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9. PQR is a triangle in which PM is the bisector of $\angle P$ and $PM \perp QR$

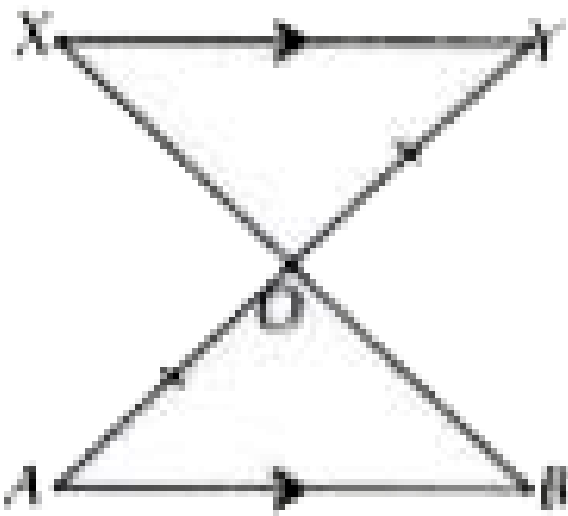
. Prove that:

$$QM = RM$$



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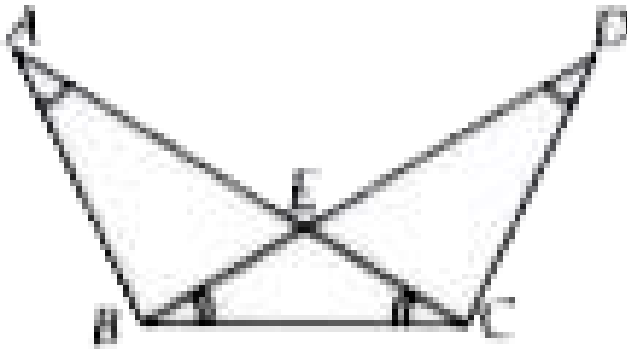
10. In the figure $\overline{AB} \parallel \overline{XY}$. BX and AY are the transversals intersecting at O , such that $\overline{OA} = \overline{OY}$. Show that $\triangle OAB \cong \triangle OYX$.



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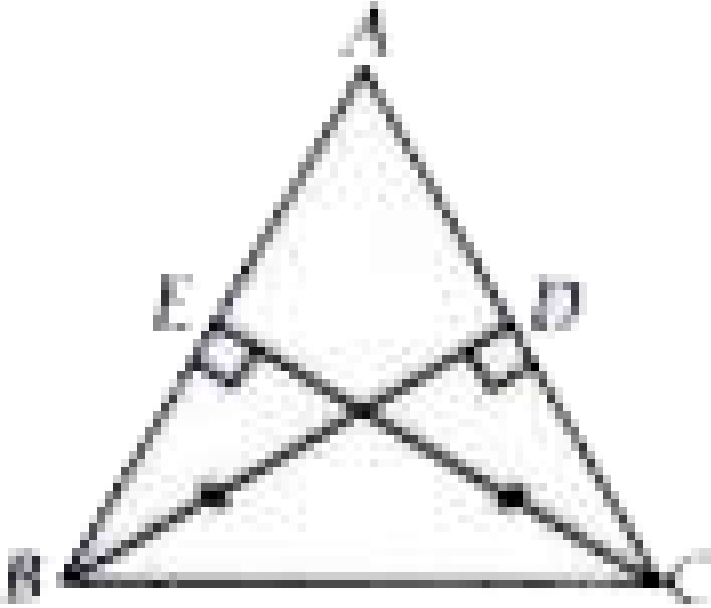
11. In the given figure, $\angle BAC = \angle CDB$ and $\angle ACB = \angle DBC$.

Prove that $AC = DB$.



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12. In $\triangle ABC$, BD and CE are perpendiculars to the sides AC and AB respectively and $BD = CE$. Prove that $\triangle BCD \cong \triangle CBE$.

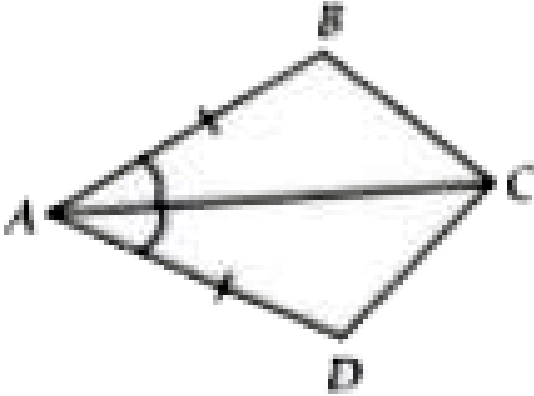


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Subjective Problems Long Answer Type

1. In the given figure, $AB = AD$ and $\angle BAC = \angle DAC$. Then

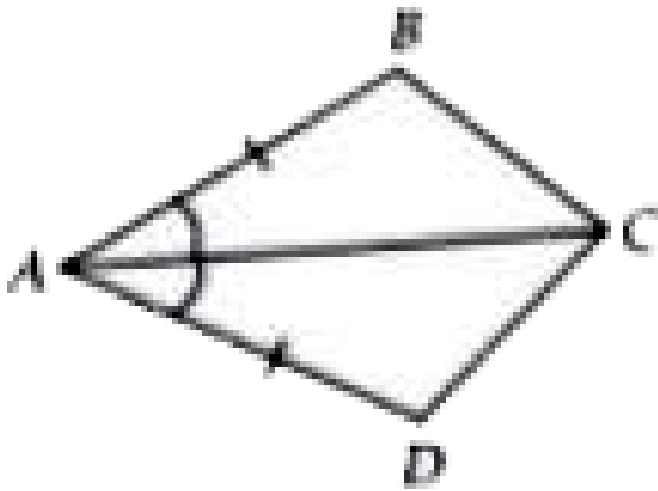
(i) $\Delta \underline{\hspace{2cm}} \cong \Delta ABC$.



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2. In the given figure, $AB = AD$ and $\angle BAC = \angle DAC$. Then

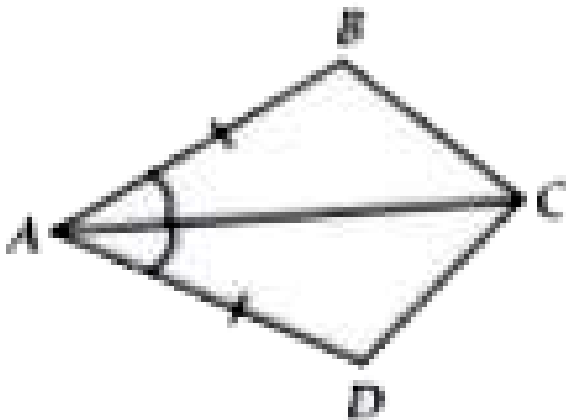
(ii) $BC = \underline{\hspace{2cm}}$.



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3. In the given figure, $AB = AD$ and $\angle BAC = \angle DAC$. Then

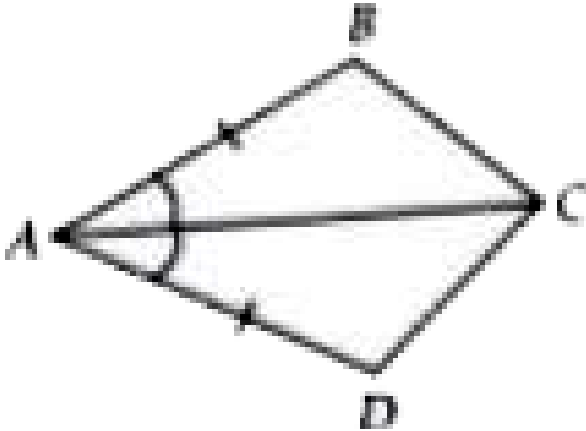
(iii) $\angle BCA = \underline{\hspace{2cm}}$.



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4. In the given figure, $AB = AD$ and $\angle BAC = \angle DAC$. Then

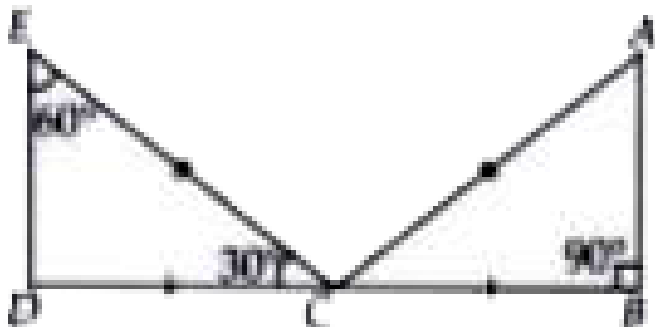
(iv) Line segment AC bisects ___ and ___.



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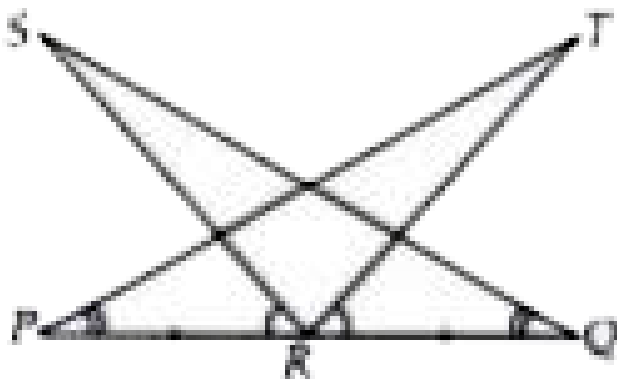
5. Two triangles ABC and CDE are such that $AC = EC$, $BC = DC$, $\angle E = 60^\circ$ and $\angle DCE = 30^\circ$ and $\angle B = 90^\circ$. Show that the

triangles are congruent, (see the figure below).



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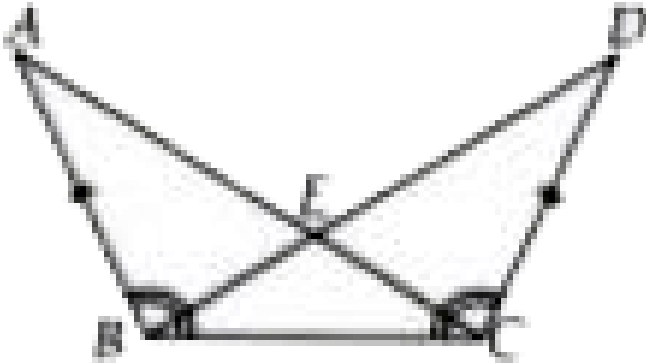
6. Prove that $\triangle SQR$ and $\triangle TPR$ are congruent and $SR = TR$.



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7. $AB = DC$ and $\angle ABC = \angle DCB$. Prove that:

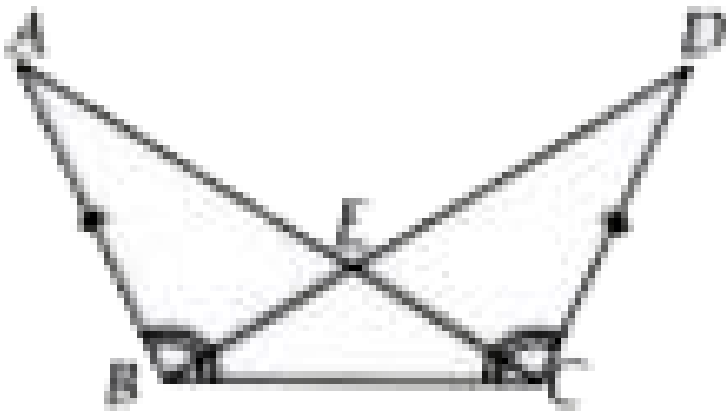
$AC = DB$



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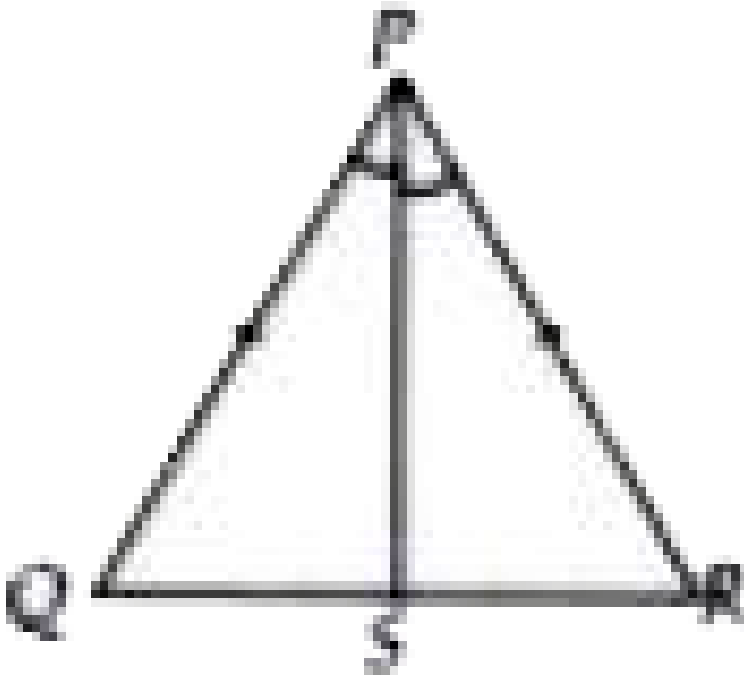
8. $AB = DC$ and $\angle ABC = \angle DCB$. Prove that:

$DB = CA$



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9. In the figure below, $\triangle PQR$ is an isosceles triangle in which $\overline{PQ} = \overline{PR}$. PS is the bisector of $\angle P$. Show that

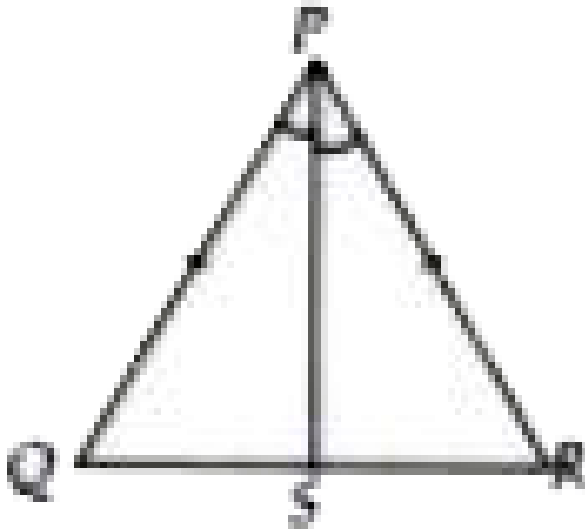


$$\Delta PQS \cong \Delta PRS$$



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10. In the figure below, ΔPQR is an isosceles triangle in which $\overline{PQ} = \overline{PR}$. PS is the bisector of $\angle P$. Show that



$$\overline{PS} \perp \overline{QR}$$

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Olympiad Hots Corner

1. In two triangles PQR and LMN, $PQ = QR$, $\angle P = \angle M$ and $QR = LN$, then which of the following is true?

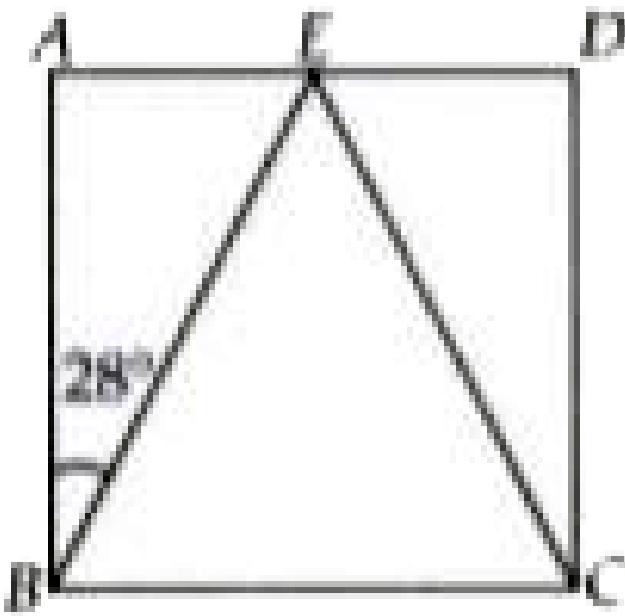
- A. Triangles are congruent only
- B. Triangles are isosceles only
- C. Triangles are both congruent and isosceles
- D. can't be determined

Answer: D



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2. In the given figure (not drawn to scale), ABCD is a square such that $AE = DE$. Find $\angle BEC$.



A. 28°

B. 56°

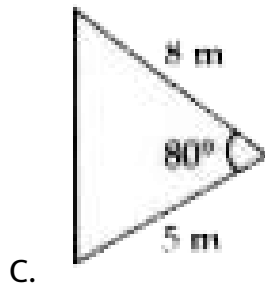
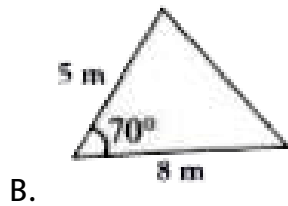
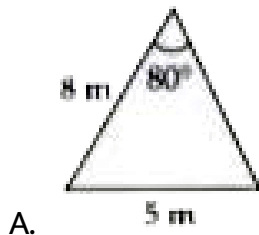
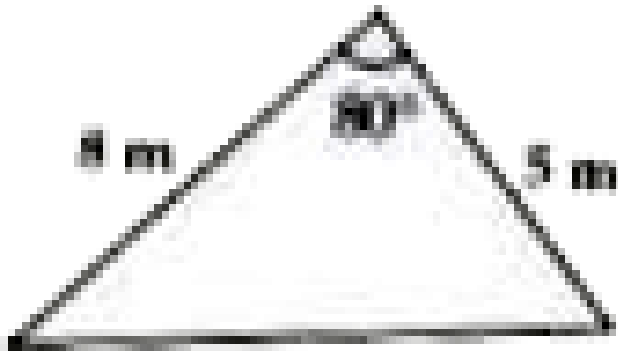
C. 62°

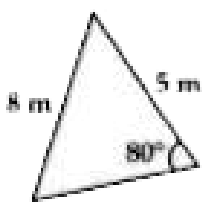
D. 24°

Answer: B

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3. Which of the following triangles is congruent to the given triangle?



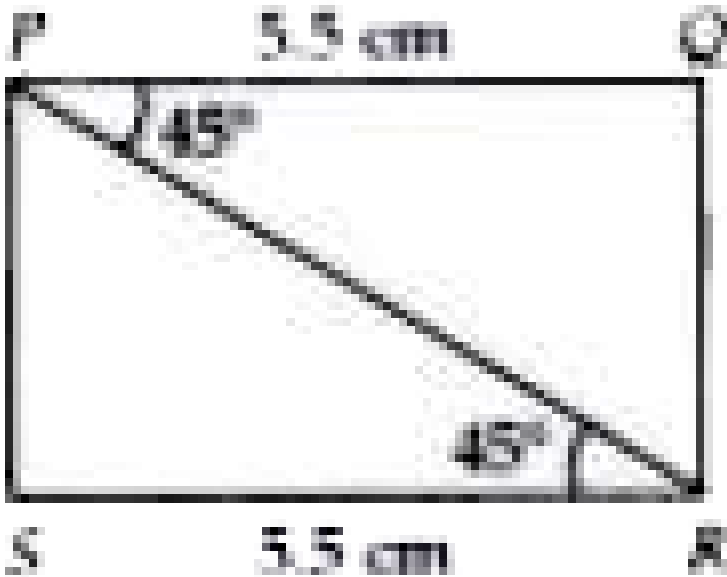


D.

Answer: C

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4. In the given figure, which of the following is correct?



A. $\triangle PQR \cong \triangle RSP$

B. $\triangle PQR \cong \triangle SRP$

C. $\triangle PQR \cong \triangle RPS$

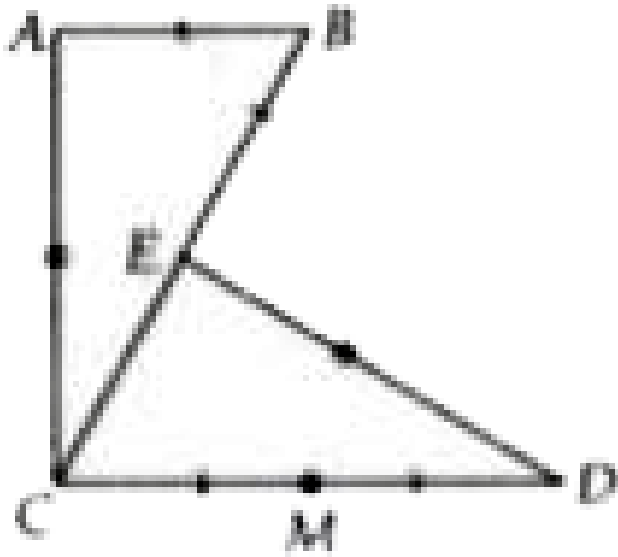
D. $\triangle PQR \cong \triangle SPR$

Answer: A



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5. In the given figure, state whether the triangles are congruent and choose the correct order.



A. Yes, $\triangle ABC \cong \triangle DCE$

B. Yes, $\triangle DCE \cong \triangle CBA$

C. Yes, $\triangle DEC \cong \triangle CAB$

D. can't be determined

Answer: D



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6. Triangles DEF and LMN are both isosceles with $DE = DF$ and $LM = LN$, respectively. If $DE = LM$ and $EF = MN$, then, are the two triangles congruent? Which condition do you use? If $\angle E = 40^\circ$, what is the measure of $\angle N$?

A. $\angle A = \angle L$

B. $\angle B = \angle M$

C. $\angle C = \angle N$

D. All of these

Answer: B



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7. By which congruency criterion, the two triangles in the given figure are congruent?



A. RHS

B. SSS

C. SAS

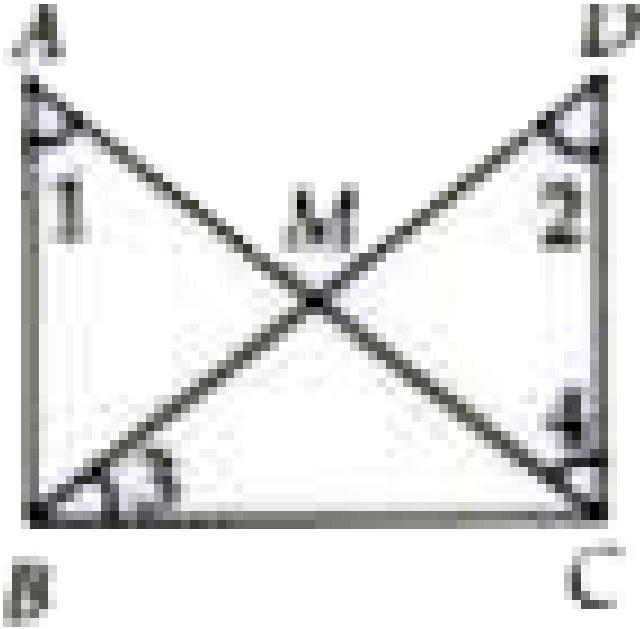
D. ASA

Answer: B



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8. In the given figure, M is the mid-point of both AC and BD. Then



- A. $\angle 1 = \angle 2$
- B. $\angle 1 = \angle 4$
- C. $\angle 2 = \angle 4$
- D. $\angle 1 = \angle 3$

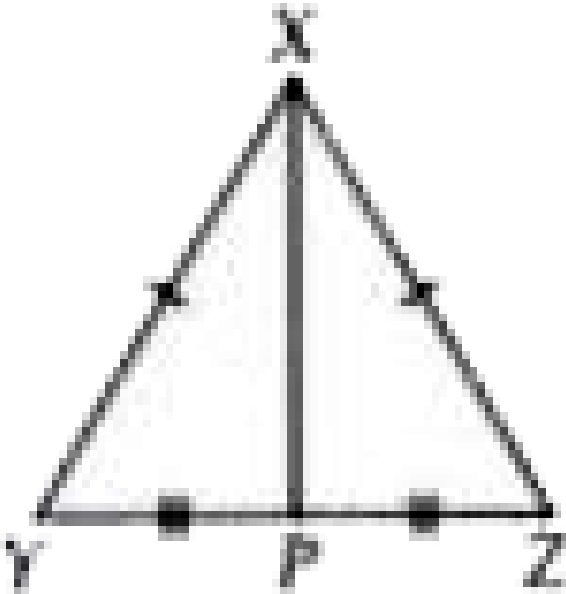
Answer: B



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9. In an isosceles triangle XYZ with $XY = XZ$, XP bisects the base YZ .

Which of the following congruence criterion can be used to conclude that $\triangle XYP \cong \triangle XZP$?



A. RHS

B. SSS

C. ASA

D. None of these

Answer: B

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10. In two triangles ABC and FDE , $\angle B = \angle D = 90^\circ$, $AC = FE$ and $BC = DE$. Then $\angle F = \underline{\hspace{2cm}}$.

A. $\angle C$

B. $\angle A$

C. $\angle B$

D. can't be determined

Answer: B

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