QB365

Important Questions - Triangles

9th Standard CBSE

Mathematics

Reg.No. :

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

1) A closed figure formed by three intersecting lines is called **1**

(a) circle (b) square (c) triangle (d) rhombus

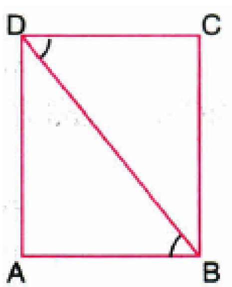
2) If the side of a square is a cm, what is the side of a congruent square? **1**

(a) 1 cm (b) 2 cm (c) a cm (d) 2a cm

3) ΔABC ≅ ΔPQR, then which of the following is true: **1**

(a) A R (b) AB=QR (c) AC=PQ (d) AB=PQ

4) In the given figure, if AB = DC, ∠ABD = ∠CDB, which congruence rule would you apply to prove ΔABD ≅ CDB? **1**



(a) SAS (b) SSS (c) AAS (d) SAS

5) In ΔABC and ΔPQR, AB = PR and ∠A = ∠P. The two triangles will be congruent by SAS axiom if: **1**

(a) BC=QR (b) AC=PQ (c) AC=QR (d) BC=PR

6) The measure of each angle of an equilateral triangle is **1**

(a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0

7) In triangles ABC and PQR, AB = AC, ∠C = ∠Pand ∠B = ∠Q. The two triangles are: **1**

(a) isosceles but not congruent (b) isosceles and congruent (c) congruent but not isosceles

(d) neither isosceles nor congruent

8) Which of the following is false? **1**

(a) The mid-point of the hypotenuse of a right triangle is equidistant from its vertices.

(b) Each angle of an equilateral triangle is 60°

(c) The side opposite to the greater angle of a triangle is longer than the side opposite the smaller angle

(d) The two altitudes corresponding to two equal sides of a triangle are not equal.

9) If ΔABC ≅ DEF by SSS congruence rule then: **1**

(a) AB = EF, BC = FD, CA = DE (b) AB = FD, BC = DE, CA = EF (c) AB = DE, BC = EF, CA = FD

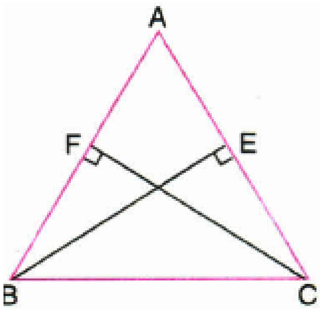
(d) AB = DE, BC = EF, ∠C = ∠F

10) If ΔABC is right angled at B, then: **1**

(a) AB = AC (b) AC < AB (c) AB=BC (d) AC > Ab

Section-B

11) ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively (see figure). Show that these altitudes are equal. **2**



12) In ΔABC, if ∠A = 50° and ∠B = 60°, determine the shortest and the longest side of the triangle. **2**

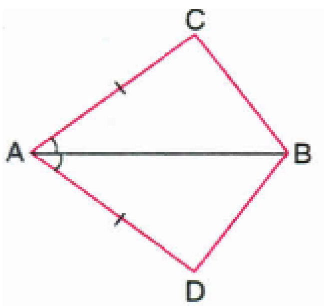
13) In a ΔDEF, if ∠D = 30°, ∠E = 60° then which side of the triangle is longest and which side is shortest? **2**

14) In ΔABC, ∠A = 60°, ∠B = 40°, which side of this triangle is the smallest? Give reasons for your answer. **2**

15) In ΔPQR, ∠P = 100° and ∠R = 60°, which side of the triangle is the longest. Give reasons for your answer. **2**

16) In quadrilateral ACBD, AC=AD and AB bisects $\angle A$ (see figure). **2**

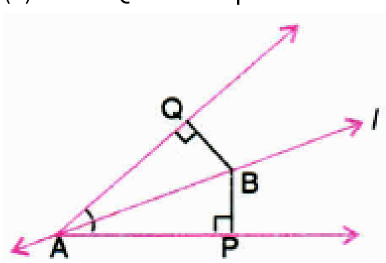
Show that $\triangle ABC \cong \triangle ABD$. What can you say about BC and BD?



17) Line l is the bisector of an angle$\angle A$ and $\angle B$ is any point on I.BP and BQ are perpendiculars from B to the arms of $\angle A$ (see figure). Show that: **2**

(i) $\triangle APB \cong \triangle AQB$

(ii) BP = BQ or B is equidistant from the arms of $\angle A$

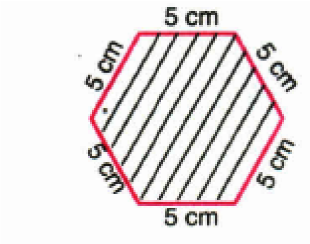


18) AD is an altitude of an isosceles triangle ABC in which AB = AC Show that **2**

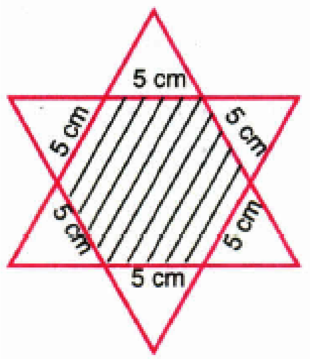
(i) AD bisects BC (ii) AD bisects $\angle A$

19) In a triangle locate a point in its interior which is equidistant from all the sides of the triangle. **2**

20) Complete the hexagonal and star shaped Rangolies [see figures (i) and (ii)] by filling them with as many equilateral triangles of side 1em as you can.Count the number of triangles in each case.Which has more triangles? **2**



(i)



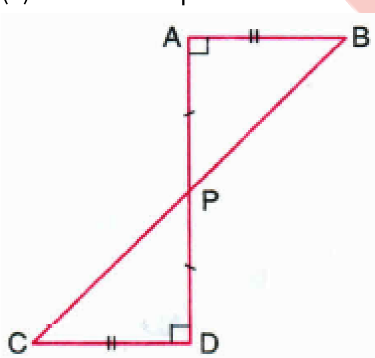
(ii)

Section-C

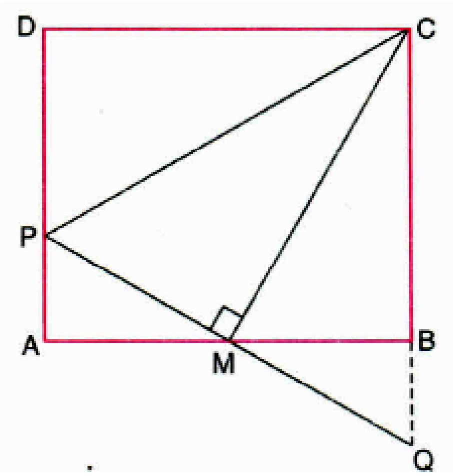
21) In the given figure, AB and CD are perpendicular to the line segment AD. AD and BC intersect at P such that PA = PD. Prove that: **5**

(i) AB = CD

(ii) P is the mid-point of BC.

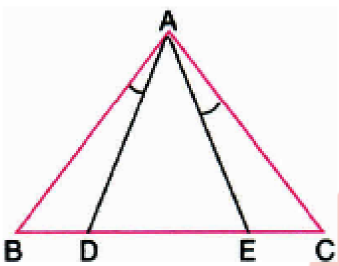


22) In the given figure ABCD is a square and M is the mid-point of AB. $PQ \perp CM$ meets AD at P and CB produced at Q. Prove that PA = BQ. **5**



23) ABC is an isosceles triangle with AB = AC.Draw $AP \perp BC$.Show that $\angle B = \angle C$ **5**

24) In the figure, D and E are points on the base BC of a $\triangle ABC$ such that AD = AE and $\angle BAD = \angle CAE$.prove that AB = AC **5**



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Section-A

1) (c) triangle **1**

2) (c) a cm **1**

3) (d) AB=PQ **1**

4) (a) SAS **1**

5) (b) AC=PQ **1**

6) (c) 60^0 **1**

7) (a) isosceles but not congruent **1**

8) (d) The two altitudes corresponding to two equal sides of a triangle are not equal. **1**

9) (c) AB = DE, BC = EF, CA = FD **1**

10) (d) AC > Ab **1**

Section-B

11) **2**

Given: ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively.

To Prove: BE = CF

Proof: ABC is an isosceles triangle

AB = AC

$\angle ABC = \angle ACB$ | Angles opposite to equal sides of a triangle are equal

In $\triangle BEC$ and $\triangle CFB$

$\angle BEC = \angle CFB$ | Each = 90^0

BC = CB

$\angle ECB = \angle FBC$

$\triangle BEC \cong \triangle CFB$ | By AAS Rule

BE = CF | C.P.C.T

12) BC, AB **2**

13) DE, EF **2**

14) AC as ∠B is the smallest. **2**

15) QR as ∠P is the greatest **2**

16) Given:In quadrilateral ACBD, AC=AD and AB bisects $\angle A$ **2**

To prove: $\triangle ABC \cong \triangle ABD$

proof: In $\triangle ABC$ and $\triangle ABD$

AC=AD

AB=AB

$\angle CAB = \angle DAB$ | AB bisects $\angle A$

$\triangle ABC \cong \triangle ABD$ | SAS Rule

BC=BD | C.P.C.T

17) **2**

Given: Line l is the bisector of an angle$\angle A$ and $\angle B$ is any point on I.BP and BQ are perpendiculars from B to the arms of $\angle A$

To Prove: (i) $\triangle APB \cong \triangle AQB$

(ii) BP = BQ or B is equidistant from the arms of $\angle A$

Proof: (i) In $\triangle APB$ and $\triangle AQB$

$\angle BAP = \angle BAQ$ | l is the bisector of $\angle A$

AB = AB | Common

$\angle BAP = \angle BAQ$ | Each = 90^0

BP = BQ or B is equidistant from the arms of $\angle A$

$\triangle APB \cong \triangle AQB$ | SAS Rule

(ii) $\triangle APB \cong \triangle AQB$ | Proved in (i) above

BP = BQ | C.P.C.T

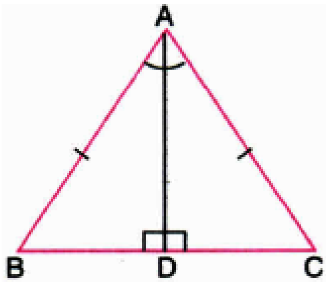
18) Given: AD is an altitude of an isosceles triangle ABC in which AB = AC. **2**

To prove: (i) AD bisects BC (ii) AD bisects $\angle A$

Proof: (i) In right $\triangle ADB$ and right $\triangle ADC$

Hyp.AB = Hyp. AC

Side AD = Side AD



$\triangle ADB \cong \triangle ADC$ | RHS rule

BD = CD | C.P.C.T

AD bisects BC

(ii) $\triangle ADB \cong \triangle ADC$

$\angle BAD = \angle CAD$

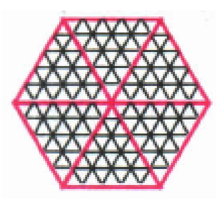
AD bisects $\angle A$

19) **2**

Draw the angle bisectors of any two angles of the triangle. Their point of intersection is the required point.

20) (i) Number of triangles = 25 x 6 **2**

= 25 + 25 + 25 + 25 + 25 + 25 = 150

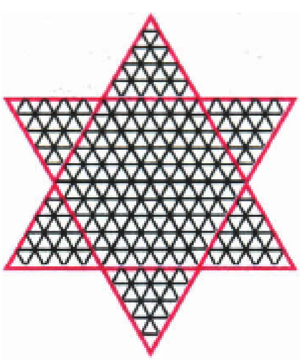


(i)

(ii) Number of triangles = 25 x 6 + 25 x 6

= 150 + 150

= 300



(ii)

Figure (ii) has more triangles.

Section-C

21) Given: AB and CD are perpendicular to the line segment AD. AD and BC intersect at P such that PA = PD. **5**

To Prove: (i) AB = CD

(ii) P is the mid-point of BC.

Proof: (i) In $\triangle ABD$ and $\triangle PDC$

PA = PD

$\angle APB = \angle DPC$ | Vertically opposite angles

$\angle PAB = \angle PDC$ | Each 90^0

$\triangle PAB \cong \triangle PDC$ | ASA congruence rule

AB = DC | C.P.C.T

AB = CD | C.P.C.T

(ii) Also, PB = PC

P is the mid-point of BC.

22) Given: ABCD is a square and M is the mid-point of AB. $PQ \perp CM$ meets AD at P and CB produced at Q **5**

To prove: PA = BQ.

Proof: In $\triangle PAM$ and $\triangle QBM$

PM = QM | M is the midpoint of AB

$\angle PMA = \angle QMB$ | Vertically opposite rule

$\angle PAM = \angle QBM$ | Each 900

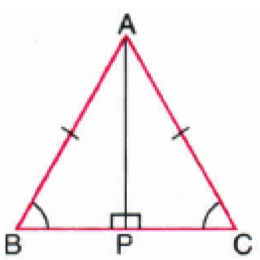
$\triangle PAM \cong \triangle QBM$

PA = QB | C.P.C.T

PA = BQ

23) Given: ABC is an isosceles triangle with AB = AC; $AP \perp BC$ **5**

To prove: $\angle B = \angle C$



Proof: In $\triangle ABC$

AB = AC

$\angle ABC = \angle ACP$ | Angles opposite to equal sides of a triangle are equal

Now, in $\triangle APB$ and $\triangle APC$

AB = AC

$\angle ABP = \angle ACP$

$\angle ABP = \angle ACP (= 90^0)$

$\triangle APB \cong \triangle APC$ | SAS congruence rule

$\angle ABP = \angle ACP$ | C.P.C.T

$\angle B = \angle C$

24)

Given: D and E are points on the base BC of a $\triangle ABC$ such that AD = AE and $\angle BAD = \angle CAE$

To prove: AB = AC

Proof: In $\triangle ADE$

AD = AE

$\angle ADE = \angle AED$ .... (1) | Angles opposite to equal sides of a triangle are equal

In $\triangle ABD$

Ext. $\angle ADE = \angle BAD + \angle ABD$ .... (2) | An exterior angle of a triangle is equal to the sum of its two interior opposite angles

$\triangle AEC$

Ext. $\angle AED = \angle CAE + \angle ACE$ .... (3) | An exterior angle of a triangle is equal to the sum of its two interior opposite angles

From (1), (2) and (3)

$\angle BAD + \angle ABD = \angle CAE + \angle ACE$

$\angle ABD = \angle ACE$

$\angle ABC = ACB$

AB = AC | Sides opposite to equal angles of a triangle are equal