

Access answers to Maths NCERT Solutions for Class 7 Chapter 6
– The Triangle and its Properties Exercise 6.4

1. Is it possible to have a triangle with the following sides?

(i) 2 cm, 3 cm, 5 cm

Solution:-

Clearly, we have:

$$(2 + 3) = 5$$

$$5 = 5$$

Thus, the sum of any two of these numbers is not greater than the third.

Hence, it is not possible to draw a triangle whose sides are 2 cm, 3 cm and 5 cm.

(ii) 3 cm, 6 cm, 7 cm

Solution:-

Clearly, we have:

$$(3 + 6) = 9 > 7$$

$$(6 + 7) = 13 > 3$$

$$(7 + 3) = 10 > 6$$

Thus, the sum of any two of these numbers is greater than the third.

Hence, it is possible to draw a triangle whose sides are 3 cm, 6 cm and 7 cm.

(iii) 6 cm, 3 cm, 2 cm

Solution:-

Clearly, we have:

$$(3 + 2) = 5 < 6$$

Thus, the sum of any two of these numbers is less than the third.

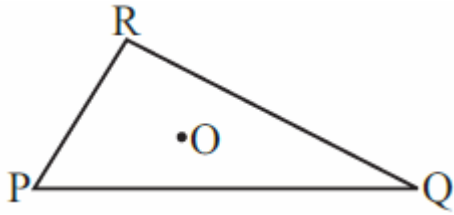
Hence, it is not possible to draw a triangle whose sides are 6 cm, 3 cm and 2 cm.

2. Take any point O in the interior of a triangle PQR. Is

(i) $OP + OQ > PQ$?

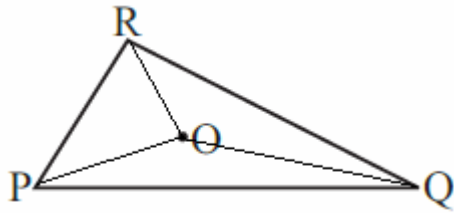
(ii) $OQ + OR > QR$?

(iii) $OR + OP > RP$?



Solution:-

If we take any point O in the interior of a triangle PQR and join OR, OP, OQ. Then, we get three triangles $\triangle OPQ$, $\triangle OQR$ and $\triangle ORP$ is shown in the figure below.



We know that,

The sum of the length of any two sides is always greater than the third side.

(i) Yes, $\triangle OPQ$ has sides OP, OQ and PQ.

So, $OP + OQ > PQ$

(ii) Yes, $\triangle OQR$ has sides OR, OQ and QR.

So, $OQ + OR > QR$

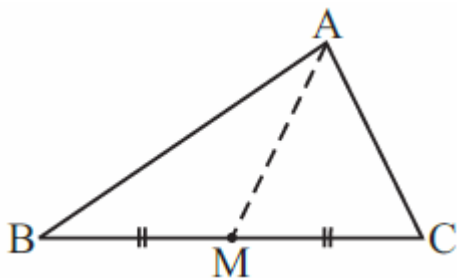
(iii) Yes, $\triangle ORP$ has sides OR, OP and PR.

So, $OR + OP > RP$

3. AM is a median of a triangle ABC.

Is $AB + BC + CA > 2 AM$?

(Consider the sides of triangles $\triangle ABM$ and $\triangle AMC$.)



Solution:-

We know that,

The sum of the length of any two sides is always greater than the third side.

Now consider the $\triangle ABM$,

Here, $AB + BM > AM$... [equation i]

Then, consider the $\triangle ACM$

Here, $AC + CM > AM$... [equation ii]

By adding equation [i] and [ii] we get,

$$AB + BM + AC + CM > AM + AM$$

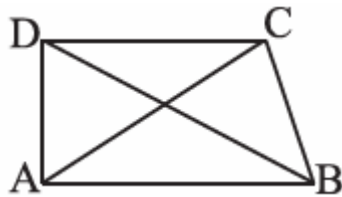
From the figure we have, $BC = BM + CM$

$$AB + BC + AC > 2 AM$$

Hence, the given expression is true.

4. ABCD is a quadrilateral.

Is $AB + BC + CD + DA > AC + BD$?



Solution:-

We know that,

The sum of the length of any two sides is always greater than the third side.

Now consider the $\triangle ABC$,

Here, $AB + BC > CA$... [equation i]

Then, consider the $\triangle BCD$

Here, $BC + CD > DB$... [equation ii]

Consider the $\triangle CDA$

Here, $CD + DA > AC$... [equation iii]

Consider the $\triangle DAB$

Here, $DA + AB > DB$... [equation iv]

By adding equation [i], [ii], [iii] and [iv] we get,

$$AB + BC + BC + CD + CD + DA + DA + AB > CA + DB + AC + DB$$

$$2AB + 2BC + 2CD + 2DA > 2CA + 2DB$$

Take out 2 on both the side,

$$2(AB + BC + CA + DA) > 2(CA + DB)$$

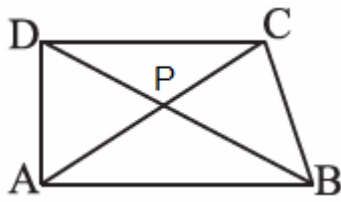
$$AB + BC + CA + DA > CA + DB$$

Hence, the given expression is true.

5. ABCD is quadrilateral. Is $AB + BC + CD + DA < 2 (AC + BD)$

Solution:-

Let us consider ABCD is quadrilateral and P is the point where the diagonals are intersect. As shown in the figure below.



We know that,

The sum of the length of any two sides is always greater than the third side.

Now consider the $\triangle PAB$,

Here, $PA + PB < AB$... [equation i]

Then, consider the $\triangle PBC$

Here, $PB + PC < BC$... [equation ii]

Consider the $\triangle PCD$

Here, $PC + PD < CD$... [equation iii]

Consider the $\triangle PDA$

Here, $PD + PA < DA$... [equation iv]

By adding equation [i], [ii], [iii] and [iv] we get,

$$PA + PB + PB + PC + PC + PD + PD + PA < AB + BC + CD + DA$$

$$2PA + 2PB + 2PC + 2PD < AB + BC + CD + DA$$

$$2PA + 2PC + 2PB + 2PD < AB + BC + CD + DA$$

$$2(PA + PC) + 2(PB + PD) < AB + BC + CD + DA$$

From the figure we have, $AC = PA + PC$ and $BD = PB + PD$

Then,

$$2AC + 2BD < AB + BC + CD + DA$$

$$2(AC + BD) < AB + BC + CD + DA$$

Hence, the given expression is true.

6. The lengths of two sides of a triangle are 12 cm and 15 cm. Between what two measures should the length of the third side fall?

Solution:-

We know that,

The sum of the length of any two sides is always greater than the third side.

From the question, it is given that two sides of triangle are 12 cm and 15 cm.

So, the third side length should be less than the sum of other two sides,

$$12 + 15 = 27 \text{ cm.}$$

Then, it is given that the third side is cannot not be less than the difference of the two sides, $15 - 12 = 3 \text{ cm}$

So, the length of the third side falls between 3 cm and 27 cm.

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