RD SHARMA

Solutions

Class 7 Maths

Chapter 15

Ex 15.4

Q1. In each of the following, there are three positive numbers. State if these numbers could possibly be the lengths of the sides of a triangle:

(i) 5, 7, 9

(ii) 2, 10.15

(iii) 3, 4, 5

(iv) 2, 5, 7

(v) 5, 8, 20

(i) Yes, these numbers can be the lengths of the sides of a triangle because the sum of any two sides of a triangle is always greater than the third side. Here, 5+7>9, 5+9>7, 9+7>5

(ii) No, these numbers cannot be the lengths of the sides of a triangle because the sum of any two sides of a triangle is always greater than the third side, which is not true in this case.

(iii) Yes, these numbers can be the lengths of the sides of a triangle because the sum of any two sides of triangle is always greater than the third side. Here, 3+4 >5, 3+5> 4, 4+5> 3

(iv) No, these numbers cannot be the lengths of the sides of a triangle because the sum of any two sides of a triangle is always greater than the third side, which is not true in this case. Here, 2 + 5 = 7

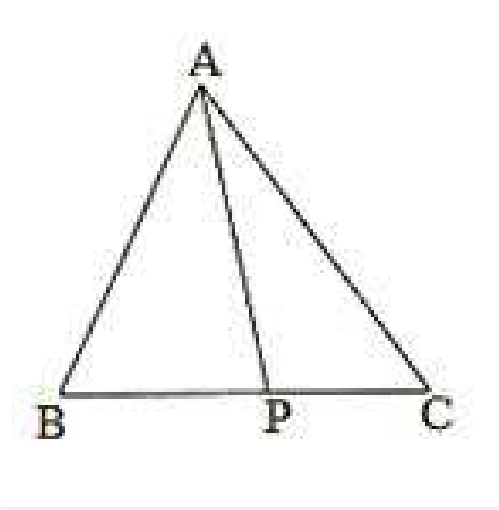
(v) No, these numbers cannot be the lengths of the sides of a triangle because the sum of any two sides of a triangle is always greater than the third side, which is not true in this case. Here, 5 + 8 <20

Q2. In Fig, P is the point on the side BC. Complete each of the following statements using symbol ' =',' > 'or ' < 'so as to make it true:

(i) AP... AB+ BP

(ii) AP... AC + PC

(iii) AP.... $\frac{1}{2}(\mathrm{AB} + \mathrm{AC} + \mathrm{BC})$



(i) In triangle APB, AP < AB + BP because the sum of any two sides of a triangle is greater than the third side.

(ii) In triangle APC, AP < AC + PC because the sum of any two sides of a triangle is greater than the third side.

(iii) AP < $\frac{1}{2}(\mathrm{AB}+\mathrm{AC}+\mathrm{BC})$ In triangles ABP and ACP, we can see that:

AP < AB + BP...(i) (Because the sum of any two sides of a triangle is greater than the third side)

AP < AC + PC...(ii) (Because the sum of any two sides of a triangle is greater than the third side)

On adding (i) and (ii), we have:

AP + AP < AB + BP + AC + PC

2AP < AB + AC + BC (BC = BP + PC)

AP < (AB-FAC+BC)

Q3. P is a point in the interior of $\triangle \mathrm{ABC}$ ***as shown in Fig. State which of the following statements are true (T) or false (F):***

(i) AP+ PB< AB

(ii) AP+ PC> AC

(iii) BP+ PC = BC

(i) False

We know that the sum of any two sides of a triangle is greater than the third side: it is not true for the given triangle.

(ii) True

We know that the sum of any two sides of a triangle is greater than the third side: it is true for the given triangle.

(iii) False

We know that the sum of any two sides of a triangle is greater than the third side: it is not true for the given triangle.

Q4. O is a point in the exterior of $\triangle \mathrm{ABC}$. ***What symbol '>','<' or '=' will you see to complete the statement OA+OB....AB? Write two other similar statements and show that***

OA+OB+OC> $\frac{1}{2}(\mathrm{AB}+\mathrm{BC}+\mathrm{CA})$

Because the sum of any two sides of a triangle is always greater than the third side, in triangle OAB, we have:

OA+OB> AB —(i)

OB+OC>BC —-(ii)

OA+OC > CA ——(iii)

On adding equations (i), (ii) and (iii) we get :

OA+OB+OB+OC+OA+OC> AB+BC+CA

2(OA+OB+OC) > AB+BC +CA

OA+ OB + OC > $\frac{AB+BC+CA}{2}$

Q5. In $\triangle ABC$, $\angle B = 30^\circ$, $\angle C = 50^\circ$. ***Name the smallest and the largest sides of the triangle.***

Because the smallest side is always opposite to the smallest angle, which in this case is 30°, it is AC. Also, because the largest side is always opposite to the largest angle, which in this case is 100°, it is BC.