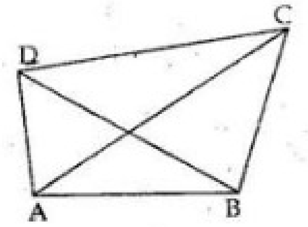
Exercise 9A

Question 9:
Given: ABCD is a quadrilateral and AC is one of its disgonals.

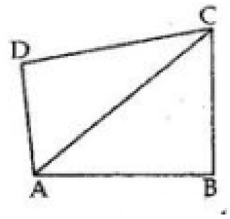


To Prove :
(i) $AB + BC + CD + DA > 2AC$
(ii) $AB + BC + CD > DA$
(iii) $AB + BC + CD + DA > AC + BD$
Construction : Join BD.
Proof : (i) In ΔABC,
$AB + BC > AC$ ...(1)
and, in ΔACD
$AD + CD > AC$ ...(2)
Adding both sides of (1) and (2), we get :
$AB + BC + CD + DA > 2AC$ ...(3)

(ii) In ΔABC,
$AB + BC > AC$
On adding CD to both sides of this inequality, we have,
$AB + BC + CD > AC + CD$ ...(4)
Now, in ΔACD, we have,
$AC + CD > DA$ ...(5)
From (4) and (5) we get
$AB + BC + CD > DA$ ...(6)

(iii) In ΔABD and ΔBDC, we have
$AB + DA > BD$ ...(7)
and $BC + CD > BD$ ...(8)
On adding (7) and (8), we get
$AB + BC + CD + DA > 2BD$ ...(9)
Adding (9) and (3), we have,
$2(AB + BC + CD + DA) > 2BD + 2AC$
i.e. $AB + BC + CD + DA > BD + AC$
[Dividing both sides by 2]

Question 10:
Given: ABCD is a quadrilateral.



To Prove : $\angle A + \angle B + \angle C + \angle D = 360°$

Construction : Join AC

Proof : In ΔABC

$\angle CAB + \angle B + \angle BCA = 180°$ ...(i)

In ΔACD,

$\angle DAC + \angle ACD + \angle D = 180°$ ...(ii)

Adding both sides of (i) and (ii) we get

$\angle CAB + \angle B + \angle BCA + \angle DAC + \angle ACD + \angle D = 180° + 180°$

$\Rightarrow \quad \angle CAB + \angle DAC + \angle B + \angle BCA + \angle ACD + \angle D = 360°$

$\Rightarrow \quad \angle A + \angle B + \angle C + \angle D = 360°$

*********** END **********