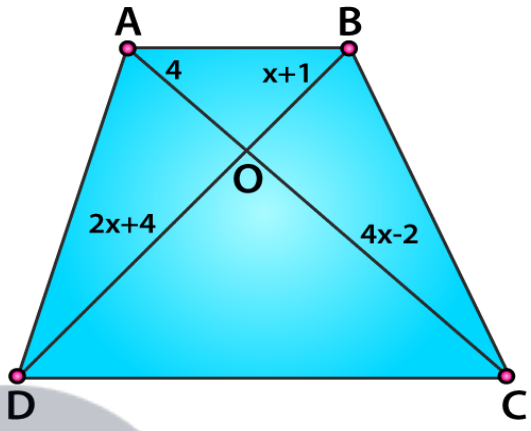
Exercise 4.4

1. (i) In fig. 4.70, if AB‖CD, find the value of x.
Solution:

It's given that AB‖CD.
Required to find the value of x.

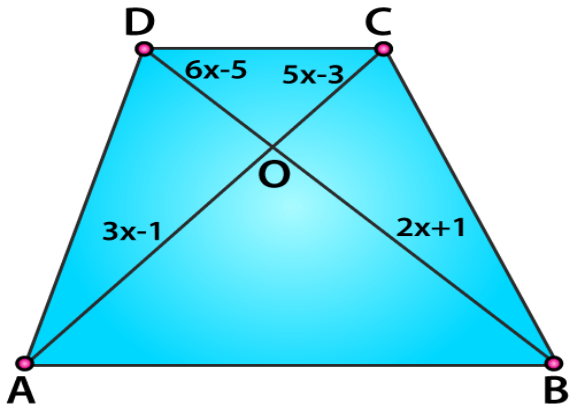


We know that,
Diagonals of a parallelogram bisect each other.
So,

$AO/CO = BO/DO$
$\Rightarrow 4/(4x-2) = (x+1)/(2x+4)$
$4(2x+4) = (4x-2)(x+1)$
$8x + 16 = x(4x-2) + 1(4x-2)$
$8x + 16 = 4x^2 - 2x + 4x - 2$
$-4x^2 + 8x + 16 + 2 - 2x = 0$
$-4x^2 + 6x + 8 = 0$
$4x^2 - 6x - 18 = 0$
$4x^2 - 12x + 6x - 18 = 0$
$4x(x-3) + 6(x-3) = 0$
$(4x+6)(x-3) = 0$
$\therefore x = -6/4$ or $x = 3$

(ii) In fig. 4.71, if AB‖CD, find the value of x.
Solution:

It's given that AB‖CD.
Required to find the value of x.



We know that,
Diagonals of a parallelogram bisect each other
So,

AO/ CO = BO/ DO

⇒ (6x – 5)/ (2x + 1) = (5x – 3)/ (3x – 1)

(6x – 5)(3x – 1) = (2x + 1)(5x – 3)

3x(6x – 5) – 1(6x – 5) = 2x(5x – 3) + 1(5x – 3)

$18x^2 – 10x^2 – 21x + 5 + x + 3 = 0$

$8x^2 – 16x – 4x + 8 = 0$

8x(x – 2) – 4(x – 2) = 0

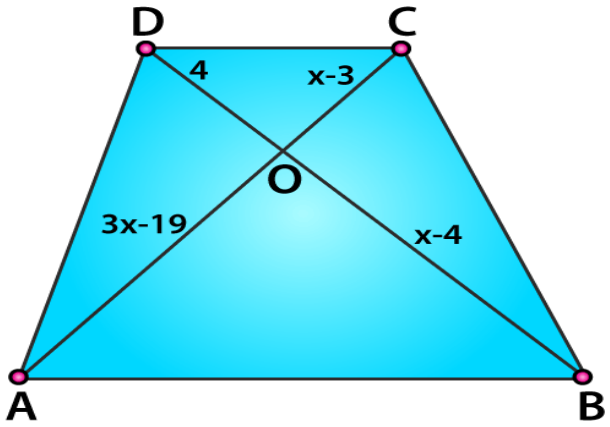
(8x – 4)(x – 2) = 0

x = 4/8 = 1/2 or x = -2

∴ x= 1/2

(iii) In fig. 4.72, if AB ∥ CD**. If OA = 3x – 19, OB = x – 4, OC = x- 3 and OD = 4, find x.**
Solution:

It's given that AB∥CD.
Required to find the value of x.



We know that,
Diagonals of a parallelogram bisect each other
So,

$AO/ CO = BO/ DO$
$(3x – 19)/ (x – 3) = (x–4)/ 4$
$4(3x – 19) = (x – 3) (x – 4)$
$12x – 76 = x(x – 4) -3(x – 4)$
$12x – 76 = x^2 – 4x – 3x + 12$
$-x^2 + 7x – 12 + 12x -76 = 0$
$-x^2 + 19x – 88 = 0$
$x^2 – 19x + 88 = 0$
$x^2 – 11x – 8x + 88 = 0$
$x(x – 11) – 8(x – 11) = 0$
$\therefore$ x = 11 or x = 8