

Exercise 4.4

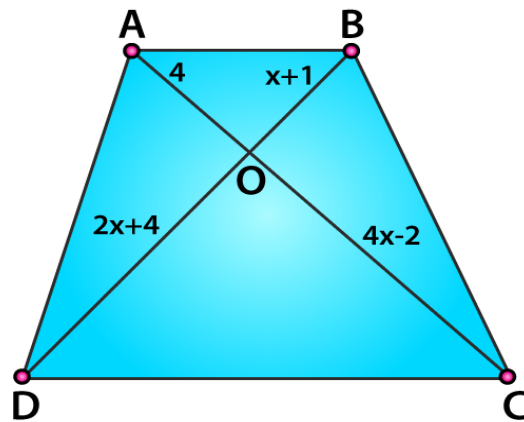
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1. (i) In fig. 4.70, if $AB \parallel CD$, find the value of x .

Solution:

It's given that $AB \parallel CD$.

Required to find the value of x .



We know that,

Diagonals of a parallelogram bisect each other.

So,

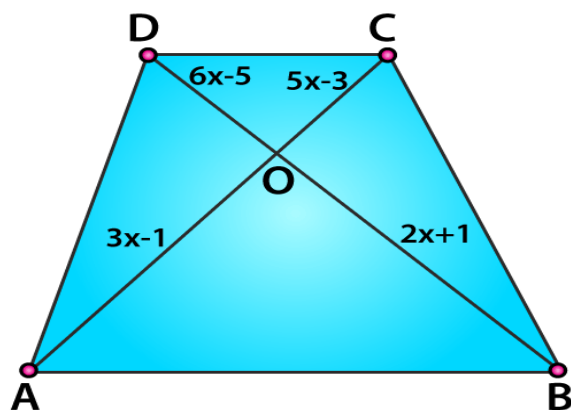
$$\begin{aligned} & AO/CO = BO/DO \\ \Rightarrow & 4/(4x-2) = (x+1)/(2x+4) \\ & 4(2x+4) = (4x-2)(x+1) \\ & 8x+16 = x(4x-2) + 1(4x-2) \\ & 8x+16 = 4x^2-2x+4x-2 \\ & -4x^2+8x+16+2-2x=0 \\ & -4x^2+6x+18=0 \\ & 4x^2-6x-18=0 \\ & 4x^2-12x+6x-18=0 \\ & 4x(x-3)+6(x-3)=0 \\ & (4x+6)(x-3)=0 \\ & \therefore x = -6/4 \text{ or } x = 3 \end{aligned}$$

(ii) In fig. 4.71, if $AB \parallel CD$, find the value of x .

Solution:

It's given that $AB \parallel CD$.

Required to find the value of x .



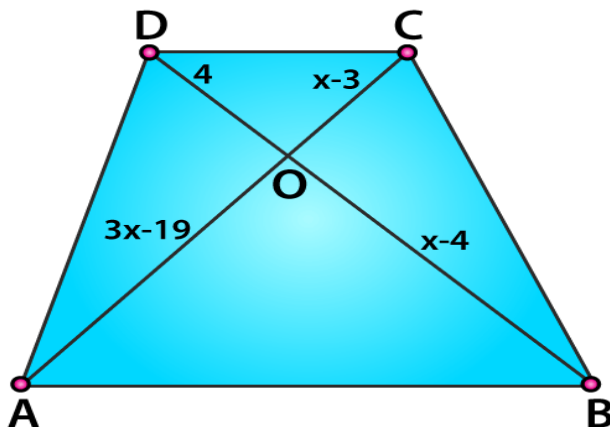
We know that,
Diagonals of a parallelogram bisect each other
So,

$$\begin{aligned} &AO/CO = BO/DO \\ \Rightarrow &(6x-5)/(2x+1) = (5x-3)/(3x-1) \\ &(6x-5)(3x-1) = (2x+1)(5x-3) \\ &3x(6x-5) - 1(6x-5) = 2x(5x-3) + 1(5x-3) \\ &18x^2 - 10x^2 - 21x + 5 + x + 3 = 0 \\ &8x^2 - 16x - 4x + 8 = 0 \\ &8x(x-2) - 4(x-2) = 0 \\ &(8x-4)(x-2) = 0 \\ &x = 4/8 = 1/2 \text{ or } x = -2 \\ \therefore &x = 1/2 \end{aligned}$$

(iii) In fig. 4.72, if $AB \parallel CD$. If $OA = 3x - 19$, $OB = x - 4$, $OC = x - 3$ and $OD = 4$, find x .

Solution:

It's given that $AB \parallel CD$.
Required to find the value of x .



We know that,

Diagonals of a parallelogram bisect each other

So,

$$AO/CO = BO/DO$$

$$(3x - 19)/(x - 3) = (x - 4)/4$$

$$4(3x - 19) = (x - 3)(x - 4)$$

$$12x - 76 = x(x - 4) - 3(x - 4)$$

$$12x - 76 = x^2 - 4x - 3x + 12$$

$$-x^2 + 7x - 12 + 12x - 76 = 0$$

$$-x^2 + 19x - 88 = 0$$

$$x^2 - 19x + 88 = 0$$

$$x^2 - 11x - 8x + 88 = 0$$

$$x(x - 11) - 8(x - 11) = 0$$

$$\therefore x = 11 \text{ or } x = 8$$