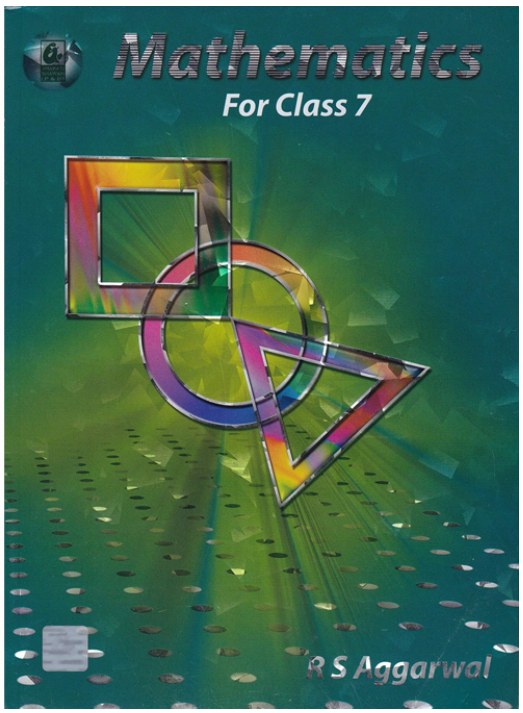
RS Aggarwal Solutions for Class 7 Maths Chapter 14–Properties of Parallel Lines

Class 7 - Chapter 14 Properties of Parallel Lines



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RS Aggarwal Solutions for Class 7 Maths Chapter 14–Properties of Parallel Lines

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RS Aggarwal Solutions for Class 7 Maths Chapter 14–Properties of Parallel Lines

RS Aggarwal 7th Maths Chapter 14, Class 7 Maths Chapter 14 solutions

Question 1.

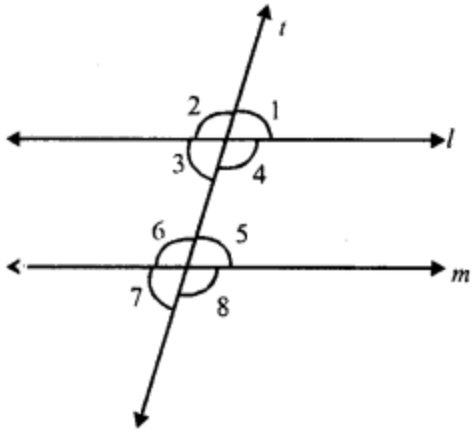
Solution:

A transversal t intersects two parallel lines l and m.

$\angle 1 = \angle 5$ (corresponding angles)

But $\angle 5 = 70°$ (given)

$\angle 1 = 70°$



But ∠ 3 = ∠ 5 (Alternate angles)

∠ 3 = 70°

∠4 + ∠5 = 180° (Sum of co-interior angles)

⇒ ∠4 + 70° = 180°

⇒ ∠4 = 180° – 70°

⇒ ∠4 = 110°

But ∠ 4 = ∠ 8 (corresponding angles)

∠ 8 = 110°

Hence ∠ 1 = 70°, ∠3 = 70°, ∠4 = 110° and ∠ 8 = 110°

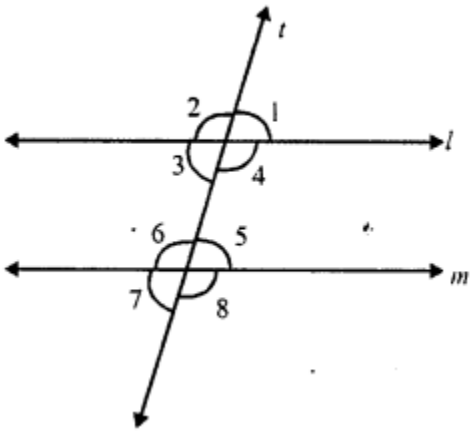
Question 2.

Solution:

A transversal t intersects two parallel lines l and m

∠1 : ∠2 = 5 : 7

But ∠ 1 + ∠ 2 = 180° (Linear pair)



$$\therefore \quad \angle 1 = \frac{180^\circ \times 5}{5+7} = \frac{180^\circ \times 5}{12} = 75^\circ$$

$$\angle 2 = \frac{180^\circ \times 7}{5+7} = \frac{180^\circ \times 7}{12} = 105^\circ$$

But ∠ 3 = ∠ 1 (vertically opposite angles)

∠ 3 = 75°

∠ 8 = ∠ 4 (corresponding angles)

and ∠ 4 = ∠ 2 (vertically opposite angles)

∠8 = ∠2 = 105°

Hence ∠ 1 = 75°, ∠2 = 105°, ∠3 = 75° and ∠ 8 = 105°

Question 3.

Solution:

A transversal t intersects two parallel lines l and m interior angles of the same side of t are (2x – 8)° and (3x – 7)°

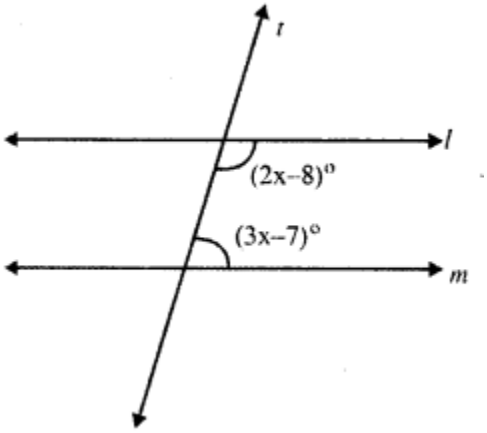
(2x – 8)° + (3x – 7)° = 180° (sum of co-interior angles)

⇒ 2x – 8 + 3x – 7 = 180°

⇒ 5x – 15° = 180°

⇒ 5x = 180° + 15°

⇒ 5x = 195°



⇒ x = 1955 = 39°

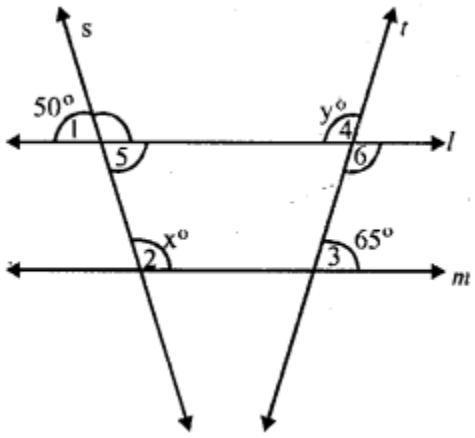
First angle = 2x – 8° = 2 x 39° – 8° = 78° – 8° = 70°

Second angle = 3x – 7 = 3 x 39° – 7° = 117° – 7° = 110°

Question 4.

Solution:

l || m and two transversals intersect these lines but s is not parallel to t.



$\angle 5 = \angle 1$ (vertically opposite angles)

$\angle 5 = 50°$

But l || m and s the transversal

$\angle 5 + \angle 2 = 180°$ (sum of co-interior angles)

$\Rightarrow 50° + x = 180°$

$\Rightarrow x = 180° – 50° – 130°$

$x = 130°$

$\angle 4 = \angle 6$ (vertically opposite angles)

$\angle 6 = y$

But l || m and t is the transversal

$\angle 6 + \angle 3 = 180°$ (sum of co-interior angles)

$\Rightarrow y + 65° = 180°$

$\Rightarrow y = 180° – 65° = 115°$

$y = 115°$

Hence $x = 130°$ and $y = 115°$

Question 5.

Solution:

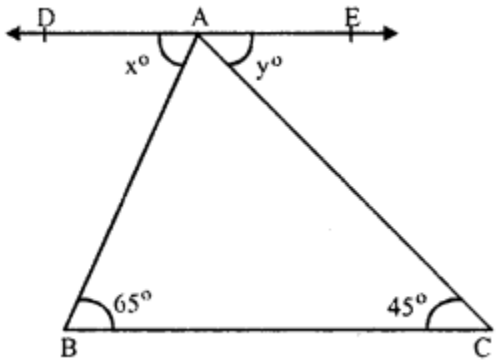
In the figure, ABC is a triangle, DAE || BC

$\angle B = 65°$, $\angle C = 45°$

$\angle DAB = x°$ and $\angle EAC = y°$

DAE || BC and AB is transversal

∠ DAB = ∠ B (Alternate angles)



⇒ x° = 65°

Similarly ∠ EAC = ∠ C (Alternate angles)

y° = 45°

Hence x = 65° and y = 45°

Question 6.

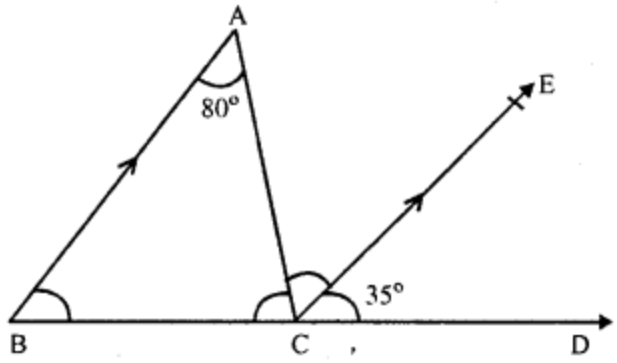
Solution:

In ∆ABC, AB || CE

∠BAC = 80°, ∠ECD = 35°

AB || CE and BCD is the transversal

∠ABC = ∠ECD (corresponding angles)



⇒ ∠ABC = 35° (∠ECD = 35°)

Again AB || CE and AC is the transversal

∠ BAC = ∠ ACE (alternate angles)

∠ACE = 80° (∠BAC = 80°)

In ∆ABC

∠A + ∠B + ∠ACB = 180° (Sum of angles of a triangle)

∠ 80° + ∠ 35° + ∠ACB = 180°

⇒ ∠ACB + ∠ 115° = 180°

⇒ ∠ACB = 180° – 115° = 65°

Hence ∠ ACE = 80°, ∠ ACB = 65° and ∠ ABC = 35°

Question 7.

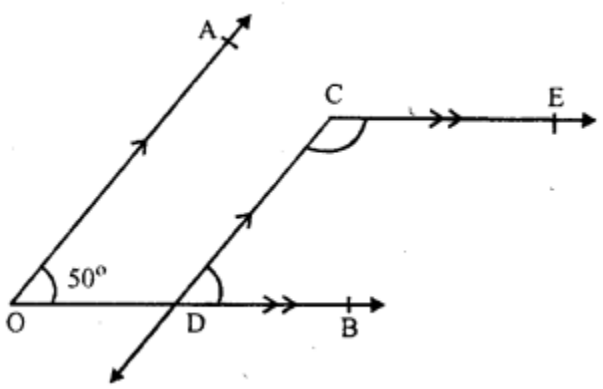
Solution:

In the figure,

AO || CD, DB || CE and ∠AOB = 50°

AO || CD and CD is the transversal

∠ AOB = ∠ CDB (corresponding angles)



∠ CDB = 50° (∠ AOB = 50°)

Similarly CE || OB and CD in transversal

∠ECD + ∠CEB = 180° (sum of co-interior angles)

⇒ ∠ECD + 50° = 180°

⇒ ∠ECD = 180° – 50° = 130°

∠ECD = 130°

Question 8.

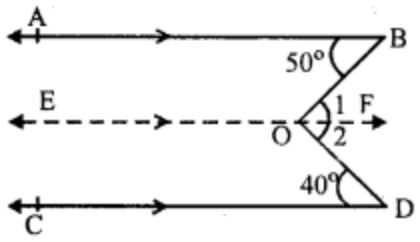
Solution:

In the fig, AB || CD

∠ABO = 50° and ∠CDO = 40°

From O, draw EOF || AB or CD

AB || EF and BO is the transversal



∠ABO = ∠ 1 (Alternate angles) …(i)

∠ CDO = ∠ 2 (Alternate angles) …(ii)

Similarly, EF || CD and OD is the transversal

Adding (i) and (ii),

∠ 1 + ∠ 2 = ∠ABO + ∠CDO

⇒ ∠BOD = 50° + 40° = 90°

Hence ∠ BOD = 90°

Question 9.

Solution:

Given : In the figure, AB || CD and EF is a transversal which intersects them at G and H respectively

GL and HM are the angle bisectors or ∠ AGH and ∠ GHD respectively.

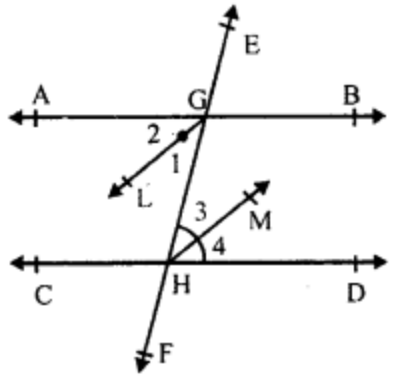
To prove : GL || HM.

Proof : AB || CD and EF is a transversal

∠ AGH = ∠ CHD (Alternate angles)

GL is the bisector of ∠ AGH

∠ 1 = ∠2 = 12 ∠ AGH



Similarly, HM is the bisectors of ∠ GHD

∠3 = ∠4 = 12 ∠ GHD

∠ AGH = ∠ GHD (proved)

∠ 1 = ∠3

But, these are alternate angles

BL || HM

Hence proved.

Question 10.

Solution:

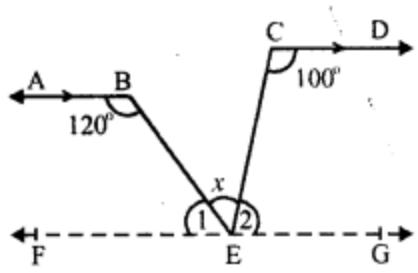
In the given figure,

AB || CD

∠ ABE = 120° and ∠ECD = 100° ∠ BEC = x°

From E, draw FG || AB or CD.

AB || EF



∠ABE + ∠1 = 180° (sum of co-interior angles)

⇒ 120° + ∠1 = 180°

⇒ ∠1 = 180°- 120° = 60°

Similarly CD || EG

∠ECD + ∠2 = 180°

⇒ 100° + ∠2 = 180°

⇒ ∠2 = 180° – 100°

∠ 2 = 80°

But ∠1 + ∠x + ∠2 = 180° (Angles on one side of a straight line)

⇒ 60° + x + 80° = 180°

⇒ x + 140° = 180°

⇒ x = 180° – 140° = 40°

x = 40°

Question 11.

Solution:

Given : In the figure, ABCD is a quadrilateral in which AB || DC and AD || BC

To prove : ∠ADC = ∠ABC

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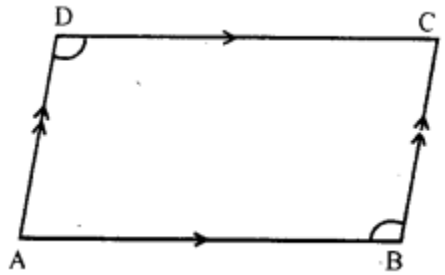
Proof : AB || DC and DA is the transversal

∠ADC + ∠ DAB = 180° (co-interior angles)



Similarly, AD || BC and AB is the transversal

∠DAB + ∠ABC = 180° …(ii)

from (i) and (ii),

∠ ADC + ∠ DAB = ∠DAB + ∠ABC

⇒ ∠ADC = ∠ABC

Hence ∠ ADC = ∠ ABC

Hence proved.

Question 12.

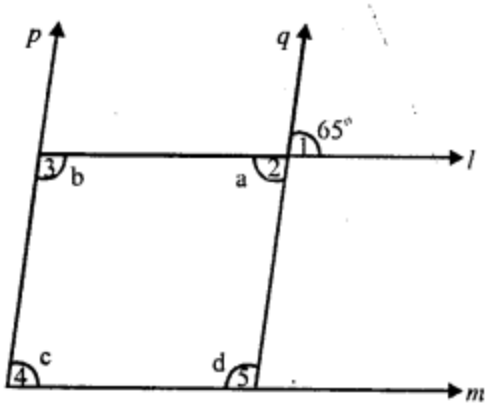
Solution:

In the figure,

l || m and p || q.

∠1 = 65°

∠ 2 = ∠ 1 (vertically opposite angles)



∠ 2 = 65°

⇒ a = 65°

p || q and l is the transversal

∠ 2 + ∠ 3 = 180° (co-interior angles)

⇒ a + b= 180°

⇒ 65° + b = 180°

⇒ b = 180° – 65° = 115°

Again l || m and p is the transversal

∠ 3 + ∠4 = 180°

⇒ b + c = 180°

⇒ 115° + c = 180°

⇒ c = 180° – 115° = 65°

l || m and q is the transversal

∠ 2 + ∠ 5 = 180°

⇒ a + d = 180°

⇒ 65° + d = 180°

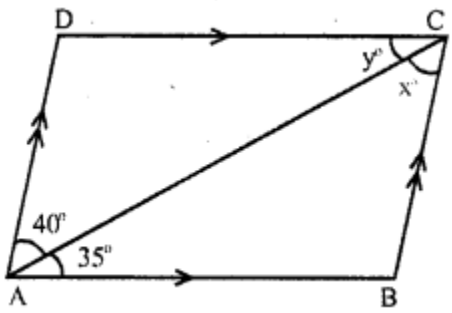
⇒ d = 180° – 65° = 115°

Hence a = 65°, b = 115°, c = 65° and d = 115°

Question 13.

Solution:

In the given figure, AB || DC and AD || BC and AC is the diagonal of parallelogram ABCD.



∠BAC = 35°, ∠CAD = 40°, ∠ACB = x° and ∠ ACD = y°. .

AB || DC and CA is the transversal

∠ DCA = ∠ CAB (Alternate angles)

⇒ y = 35°

and similarly AD || BC and AC is the transversal

∠ CAD = ∠ ACB (Alternate angles)

⇒ 40° = x°

x = 40° and y = 35°

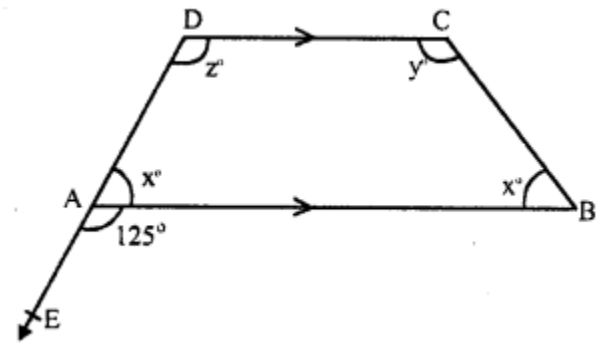
Question 14.

Solution:

In the figure, AB || CD and CD has been produced to E so that

∠ BAE = 125° ∠ BAC = x°, ∠ ABD = x°, ∠ BDC = y° and ∠ ACD = z°

DAE is a straight line and AB stands on it.



∠ BAD + ∠ BAE = 180° (Linear pair)

⇒ x + 125° = 180°

⇒ x = 180° – 125° = 55°

But ∠ABC = x = 55°

DC || AB and CB is the transversal

∠ABC + ∠ BCD = 180° (co-interior angles)

⇒ x + y = 180°

⇒ 55° + y = 180°

⇒ y = 180° – 55° = 125°

Again DC || AB and DAE is its transversal

∠ CDA = ∠ BAE (corresponding angles).

z = 125°

Hence x = 55°, y = 125° and z = 125°

Question 15.

Solution:

Given : In each figure,

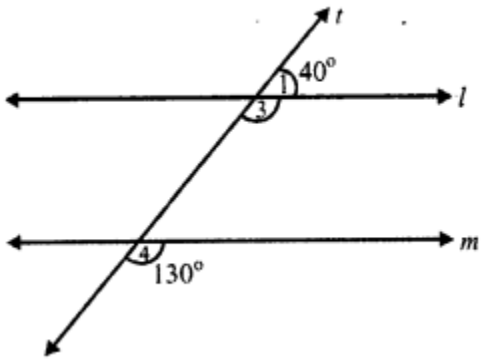
l and m are two lines and t is the transversal

To prove : l || m or not

Proof:

(i) fig. (i)

A transversal t intersects two lines l and m



and ∠ 1 = 40°, ∠2 = 130°

But ∠ 1 + ∠3 = 180° (Linear pair)

⇒ 40° + ∠ 3 = 180°

⇒ ∠3 = 180° – 40° = 140°

l || m,

If $\angle 3 = \angle 2$

$\Rightarrow 140° = 130°$

Which is not possible.

l is not parallel to m.

(ii) fig. (ii)

Transversal t, intersects l and m and $\angle 1 = 35°$, $\angle 2 = 145°$

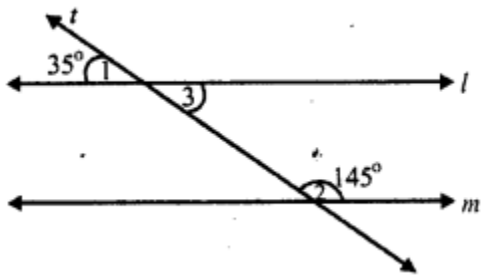
But $\angle 1 = \angle 3$ (vertically opposite angles).

$\angle 3 = 35°$

l || m,

if $\angle 3 + \angle 2 = 180°$

if $35° + 145° = 180°$



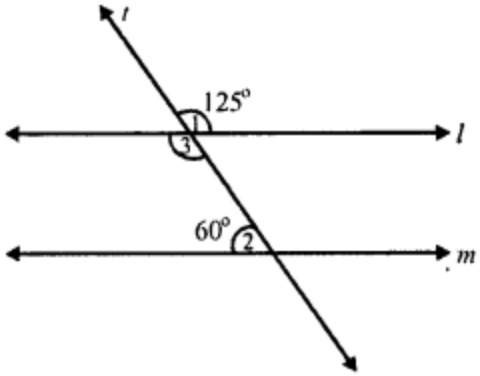
if $180° = 180°$

which is true

l || m

(iii) Transversal t, intersects l and m.

$\angle 1 = 125°$, $\angle 2 = 60°$



But ∠ 1 = ∠ 3 (vertically opposite angles)

∠ 3 = 125°

l || m

If ∠3 + ∠2 = 180° (co-interior angles)

If 125° + 60° = 180°

If 185° =180°

which is not possible.

Hence l is not parallel to m.

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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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