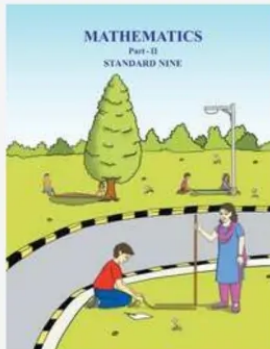


Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 2.1- Parallel Lines

BOOK SOLUTIONS
CLASS 9
MATHS (PART 2)

CHAPTER 2.1
Parallel Lines



Maharashtra Board Solutions→

For any clarifications or questions you can write to info@indcareer.com

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Maharashtra Board Solutions Class 9-Maths

(Part 2): Chapter 2.1- Parallel Lines

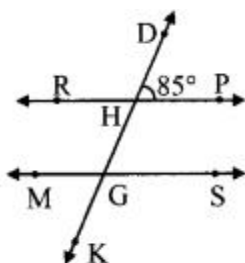
Class 9: Maths Chapter 2.1 solutions. Complete Class 9 Maths Chapter 2.1 Notes.

Maharashtra Board Solutions Class 9-Maths (Part 2): Chapter 2.1- Parallel Lines

Maharashtra Board 9th Maths Chapter 2.1, Class 9 Maths Chapter 2.1 solutions

Question :

In the given figure, line $RP \parallel$ line MS and line DK is their transversal. $\angle DHP = 85^\circ$. Find the measures of following angles.



- i. $\angle RHD$
- ii. $\angle PHG$
- iii. $\angle HGS$
- iv. $\angle MGK$

Solution:

i. $\angle DHP = 85^\circ$ (i)

$\angle DHP + \angle RHD = 180^\circ$ [Angles in a linear pair]

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$$85^\circ + \angle RHD = 180^\circ$$

$$\therefore \angle RHD = 180^\circ - 85^\circ$$

$$\therefore \angle RHD = 95^\circ \dots\dots(ii)$$

ii. $\angle PHG = \angle RHD$ [Vertically opposite angles]

$$\therefore \angle PHG = 95^\circ \text{ [From (ii)]}$$

iii. line $RP \parallel$ line MS and line DK is their transversal. [Corresponding angles]

$$\therefore \angle HGS = \angle DHP \dots\dots(iii) \text{ [From (i)]}$$

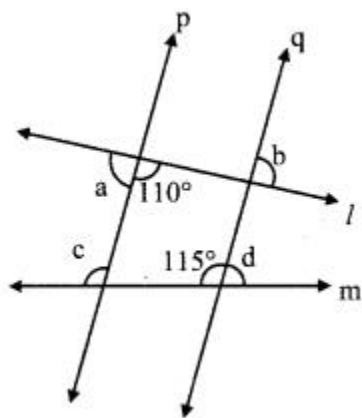
iv. $\angle HGS = 85^\circ$ [Vertically opposite angles]

$$\therefore \angle MGK = \angle HGS \quad \angle MGK = 85^\circ \text{ [From (iii)]}$$

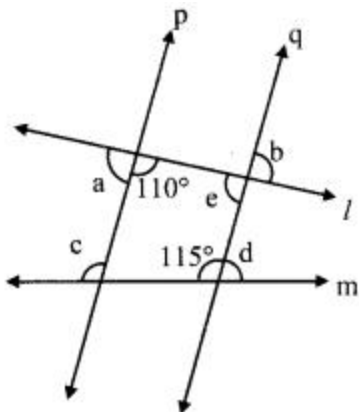
Question 2.

In the given figure line p line q and line l and line m are transversals.

Measures of some angles are shown. Hence find the measures of $\angle a$, $\angle b$, $\angle c$, $\angle d$.



Solution:



i. $110^\circ + \angle a = 180^\circ$ [Angles in a linear pair]

$$\therefore \angle a = 180^\circ - 110^\circ$$

$$\therefore \angle a = 70^\circ$$

ii. consider $\angle e$ as shown in the figure line $p \parallel$ line q , and line l is their transversal.

$$\angle e + 110^\circ = 180^\circ \text{ [Interior angles]}$$

$$\therefore \angle e = 180^\circ - 110^\circ$$

$$\therefore \angle e = 70^\circ$$

But, $\angle b = \angle e$ [Vertically opposite angles]

$$\therefore \angle b = 70^\circ$$

iii. line $p \parallel$ line q , and line m is their transversal.

$$\therefore \angle c = 115^\circ \text{ [Corresponding angles]}$$

iv. $115^\circ + \angle d = 180^\circ$ [Angles in a linear pair]

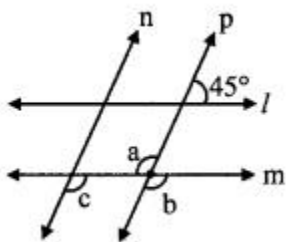
$$\therefore \angle d = 180^\circ - 115^\circ$$

$$\therefore \angle d = 65^\circ$$

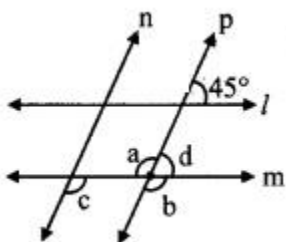
Question 3.

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In the given figure, line $l \parallel$ line m and line $n \parallel$ line p . Find $\angle a$, $\angle b$, $\angle c$ from the given measure of an angle.



Solution:



i. consider $\angle d$ as shown in the figure

line $l \parallel$ line m , and line p is their transversal.

$$\therefore \angle d = 45^\circ \text{ [Corresponding angles]}$$

Now, $\angle d + \angle b = 180^\circ$ [Angles in a linear pair]

$$\therefore 45^\circ + \angle b = 180^\circ$$

$$\therefore \angle b = 180^\circ - 45^\circ$$

$$\therefore \angle b = 135^\circ \text{(i)}$$

ii. $\angle a = \angle b$ [Vertically opposite angles]

$$\therefore \angle a = 135^\circ \text{ [From (i)]}$$

iii. line $n \parallel$ line p , and line m is their transversal.

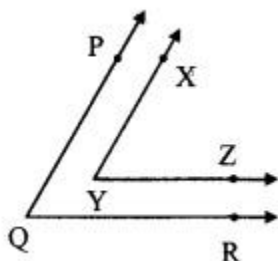
$$\therefore \angle c = \angle b \text{ [Corresponding angles]}$$

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$\therefore \angle c = 135^\circ$ [From (i)]

Question 4.

In the given figure, sides of $\angle PQR$ and $\angle XYZ$ are parallel to each other. Prove that, $\angle PQR \cong \angle XYZ$.



Given: Ray $YZ \parallel$ ray QR and ray $YX \parallel$ ray QP

To prove: $\angle PQR \cong \angle XYZ$

Construction: Extend ray YZ in the opposite direction. It intersects ray QP at point S .

Solution:

Proof:

Ray $YX \parallel$ ray QP [Given]

Ray $YX \parallel$ ray SP and seg SY is their transversal [P-S-Q]

$\therefore \angle XYZ \cong \angle PSY$ (i) [Corresponding angles]

ray $YZ \parallel$ ray QR [Given]

ray $SZ \parallel$ ray QR and seg PQ is their transversal. [S-Y-Z]

$\therefore \angle PSY \cong \angle SQR$ [Corresponding angles]

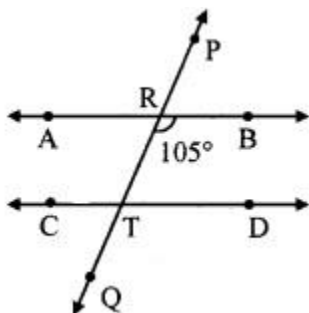
$\therefore \angle PSY \cong \angle PQR$ (ii) [P-S-Q]

$\therefore \angle PQR \cong \angle XYZ$ [From (i) and (ii)]

Question 5.

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In the given figure, line $AB \parallel$ line CD and line PQ is transversal. Measure of one of the angles is given. Hence find the measures of the following angles.



- i. $\angle ART$
- ii. $\angle CTQ$
- iii. $\angle DTQ$
- iv. $\angle PRB$

Solution:

i. $\angle BRT = 105^\circ \dots(i)$

$$\angle ART + \angle BRT = 180^\circ \text{ [Angles in a linear pair]}$$

$$\therefore \angle ART + 105^\circ = 180^\circ$$

$$\therefore \angle ART = 180^\circ - 105^\circ$$

$$\therefore \angle ART = 75^\circ \dots(ii)$$

ii. line $AB \parallel$ line CD and line PQ is their transversal.

$$\therefore \angle CTQ = \angle ART \text{ [Corresponding angles]}$$

$$\therefore \angle CTQ = 75^\circ \text{ [From (ii)]}$$

iii. line $AB \parallel$ line CD and line PQ is their transversal.

$$\therefore \angle DTQ = \angle BRT \text{ [Corresponding angles]}$$

$$\therefore \angle DTQ = 105^\circ \text{ [From (i)]}$$

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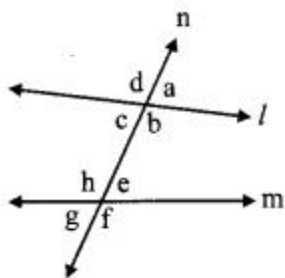
iv. $\angle PRB = \angle ART$ [Vertically opposite angles]

$\therefore \angle PRB = 75^\circ$ [From (ii)]

Question 1.

Angles formed by two lines and their transversal. (Textbook pg, no. 13)

When a transversal (line n) intersects two lines (line l and m) in two distinct points, 8 angles are formed as shown in the figure. Pairs of angles formed out of these angles are as follows:



Pairs of corresponding angles

i. $\angle d, \angle h$

ii. $\angle a, \angle e$

iii. $\angle c, \angle g$

iv. $\angle b, \angle f$

Pairs of alternate interior angles

i. $\angle c, \angle e$

ii. $\angle b, \angle h$

Pairs of alternate exterior angles

i. $\angle d, \angle f$

ii. $\angle a, \angle g$

Pairs of interior angles on the same side of the transversal

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i. $\angle c, \angle h$

ii. $\angle b, \angle e$

Some important properties:

1. When two lines intersect, the pairs of vertically opposite angles formed are congruent.

Example:

In the given diagram,

line l and m intersect at point P .

The pairs of vertically opposite angles that are congruent are:

i. $\angle a \cong \angle b$

ii. $\angle c \cong \angle d$

2. The angles in a linear pair are supplementary.

Example:

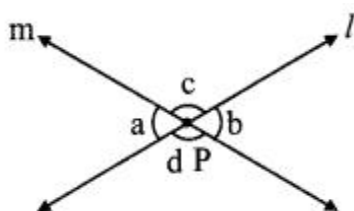
For the given diagram,

$\angle a$ and $\angle c$ are in linear pair

$$\therefore \angle a + \angle c = 180^\circ$$

Also, $\angle d$ and $\angle b$ are in linear pair

$$\therefore \angle d + \angle b = 180^\circ$$



3. When one pair of corresponding angles is congruent, then all the remaining pairs of corresponding angles are congruent.

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Example:

In the given diagram,

If $\angle a \cong \angle b$

then $\angle e \cong \angle f$, $\angle c \cong \angle d$ and $\angle g \cong \angle h$

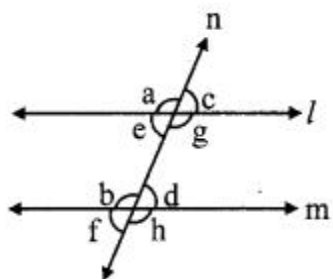
4. When one pair of alternate angles is congruent, then all the remaining pairs of alternate angles are congruent.

Example:

For the given diagram,

If $\angle e \cong \angle d$, then $\angle g \cong \angle b$

Also, $\angle a \cong \angle h$ and $\angle c \cong \angle f$



5. When one pair of interior angles on one side of the transversal is supplementary, then the other pair of interior angles is also supplementary.

Example:

For the given diagram,

If $\angle e + \angle b = 180^\circ$, then $\angle g + \angle d = 180^\circ$.



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Class 9 Maths

Part 2

- Chapter 1.1- Basic Concepts in Geometry
- Chapter 1.2- Basic Concepts in Geometry
- Chapter 1.3- Basic Concepts in Geometry
- Chapter 2.1- Parallel Lines
- Chapter 2.2- Parallel Lines
- Chapter 3.1- Triangles
- Chapter 3.2- Triangles
- Chapter 3.3- Triangles
- Chapter 3.4- Triangles
- Chapter 3.5- Triangles
- Chapter 4.1- Constructions of Triangles
- Chapter 4.2- Constructions of Triangles
- Chapter 4.3- Constructions of Triangles
- Chapter 5.1- Quadrilaterals
- Chapter 5.2- Quadrilaterals
- Chapter 5.3- Quadrilaterals
- Chapter 5.4- Quadrilaterals
- Chapter 5.5- Quadrilaterals
- Chapter 6.1- Circle
- Chapter 6.2- Circle
- Chapter 6.3- Circle
- Chapter 7.1- Co-ordinate Geometry
- Chapter 7.2- Co-ordinate Geometry
- Chapter 8.1- Trigonometry
- Chapter 8.2- Trigonometry
- Chapter 9.1- Surface Area and Volume
- Chapter 9.2- Surface Area and Volume
- Chapter 9.3- Surface Area and Volume

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The Maharashtra State Board of Secondary and Higher Secondary Education or MSBSHSE (Marathi: महाराष्ट्र राज्य माध्यमिक आणि उच्च माध्यमिक शिक्षण मंडळ), is an **autonomous and statutory body established in 1965**. The board was amended in the year 1977 under the provisions of the Maharashtra Act No. 41 of 1965.

The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

The Maharashtra government established the Maharashtra State Bureau of Textbook Production and Curriculum Research, also commonly referred to as Ebalbharati, in 1967 to take up the responsibility of providing quality textbooks to students from all classes studying under the Maharashtra State Board. MSBHSE prepares and updates the curriculum to provide holistic development for students. It is designed to tackle the difficulty in understanding the concepts with simple language with simple illustrations. Every year around 10 lakh students are enrolled in schools that are affiliated with the Maharashtra State Board.

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As of now, the MSCERT and Balbharti are responsible for the syllabus and textbooks of Classes 1 to 8, while Classes 9 and 10 are under the Maharashtra State Board of Secondary and Higher Secondary Education (MSBSHSE).

How many state boards are there in Maharashtra?

The Maharashtra State Board of Secondary & Higher Secondary Education, conducts the HSC and SSC Examinations in the state of Maharashtra through its nine Divisional Boards located at Pune, Mumbai, Aurangabad, Nasik, Kolhapur, Amravati, Latur, Nagpur and Ratnagiri.

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