Important Questions for Class 9 Maths Chapter 6: Chapter 6 of Class 9 Maths, "Lines and Angles," focuses on the relationships between different types of angles formed by intersecting lines. Key concepts include complementary and supplementary angles, vertically opposite angles, and the properties of parallel lines cut by a transversal. Important questions often involve proving angle relationships, calculating unknown angles, and applying theorems related to parallel lines.

Students should be familiar with angle pairs, such as alternate interior, alternate exterior, and corresponding angles, as these are crucial for solving problems. Mastery of this chapter lays the foundation for understanding geometric concepts in higher classes.

Important Questions for Class 9 Maths Chapter 6 Overview

Important Questions for Class 9 Maths Chapter 6 Lines and Angles covers essential concepts such as complementary and supplementary angles, vertically opposite angles, and the properties of parallel lines intersected by a transversal. Important questions from this chapter are vital for developing critical thinking and problem-solving skills, as they require students to apply geometric theorems and properties.

Mastering these questions enhances students' understanding of angle relationships, which is foundational for future geometry topics. Additionally, these concepts are frequently tested in exams, making proficiency in this chapter crucial for academic success and a solid groundwork for higher-level mathematics.

Important Questions for Class 9 Maths Chapter 6 Lines and Angles

Below is the Important Questions for Class 9 Maths Chapter 6 Lines and Angles -

Question 1: If one angle of the triangle is equal to the sum of the other two angles, then the triangle is

(A) An equilateral triangle

(B) An obtuse triangle

(C) An isosceles triangle

(D) A right triangle

Solution 1: (D) A right triangle

Explanation:

We suppose the angles of △ABC be ∠A, ∠B and ∠C

Given, ∠A= ∠B+∠C …(equation 1)

But, in any △ABC,

Using the angle sum property, we have,

∠A+∠B+∠C=180o …(equation 2)

From equations (eq1) and (eq2), we get

∠A+∠A=180o

⇒2∠A=180o

⇒∠A=180o/2 = 90o

⇒∠A = 90o

Thus, we get that the triangle is a right-angled triangle

Question 2. The exterior angle of the triangle is 105°, and its two interior opposite angles are equal. Each of these equal angles is

(A) 75°

(B) 52 ½o

(C) 72 ½o

(D)37 ½o

Solution 2: (B) 52 ½o

Explanation:

As per the question,

The exterior angle of the triangle will be = 105°

We suppose the two interior opposite angles of the triangle = x

We know that,

The exterior angle of a triangle will be = the sum of interior opposite angles

Thus, we have,

105° = x + x

2x = 105°

x = 52.5°

x = 52½

Question 3: The angles of the triangle are in the ratio 5 : 3: 7. The triangle is

(A) An acute angled triangle

(B) An isosceles triangle

(C) A right triangle

(D) An obtuse-angled of triangle

Solution 3: (A) An acute angled triangle

Explanation:

As per the question,

The angles of the triangle are in the ratio of 5 : 3: 7

Let the ratio 5:3:7 be 5x, 3x and 7x

Using the angle sum property of the triangle,

5x + 3x +7x =180

15x=180

x=12

Putting the value of x, i.e., x = 12, in 5x, 3x and 7x we have,

5x = 5×12 = 60

3x = 3×12 = 36

7x = 7×12 = 84

As all the angles are less than 90, the triangle will be an acute-angled triangle.

Question 4: In the given figure, if PQ || RS, then find the measure of angle m.

Solution 4:

Here, PQ || RS, PS is a transversal.

⇒ ∠PSR = ∠SPQ = 56°

Also, ∠TRS + m + ∠TSR = 180°

14° + m + 56° = 180°

⇒ m = 180° – 14 – 56 = 110°

Question 5: In Figure, the lines AB and CD intersect at the point O. If ∠AOC +∠BOE = 70° and ∠BOD = 40°, find ∠BOE and the reflex ∠COE.

Solution 5:

From the diagram, we have

(∠AOC +∠BOE +∠COE) and (∠COE +∠BOD +∠BOE) forming a straight line.

Then, ∠AOC+∠BOE +∠COE = ∠COE +∠BOD+∠BOE = 180°

Now, by substituting the values of ∠AOC + ∠BOE = 70° and ∠BOD = 40° we have,

∠COE = 110° and ∠BOE = 30°

So, reflex ∠COE = 360o – 110o = 250°

Question 6: In the given figure, POQ is the line. The ray OR is the perpendicular to the line PQ. OS is another ray lying between the rays OP and OR. Prove that ∠ROS = 12 (∠QOS – ∠POS).

Solution 6:

Given that OR is perpendicular to PQ

⇒ ∠POR = ∠ROQ = 90°

∴ ∠POS + ∠ROS = 90°

⇒ ∠ROS = 90° – ∠POS

Adding ∠ROS to both sides, we have

$\angle ROS + \angle ROS = (90° + \angle ROS) – \angle POS$

$\Rightarrow 2\angle ROS = \angle QOS – \angle POS$

$\Rightarrow \angle ROS = 12 (\angle QOS – \angle POS)$.

Question 7: In Figure, the lines XY and MN intersect at the point O. If ∠POY = 90° and a: b = 2 : 3, find c.

Solution 7:

We know, the sum of the linear pair is always equal to 180°

Thus,

$\angle POY + a + b = 180°$

Putting the value of $\angle POY = 90°$ (given in the question), we have,

$a+b = 90°$

Now, given, a: b = 2 : 3, so,

We suppose a be 2x, and b be 3x

$\therefore 2x+3x = 90°$

Solving this equation, we get

$5x = 90°$

So, $x = 18°$

$\therefore a = 2\times18° = 36°$

In the similar manner, b can be calculated, and the value will be

$b = 3\times18° = 54°$

From the given diagram, b+c also forms a straight angle, so,

$b+c = 180°$

$c+54° = 180°$

Therefore, $c = 126°$

Question 8: In the Figure, ∠PQR = ∠PRQ, then prove that ∠PQS = ∠PRT.

Solution 8:

As ST is a straight line so,

$\angle PQS + \angle PQR = 180°$ (since it is a linear pair) and

$\angle PRT + \angle PRQ = 180°$ (since it is a linear pair)

Now, $\angle PQS + \angle PQR = \angle PRT + \angle PRQ = 180°$

We know, $\angle PQR = \angle PRQ$ (as given in the question)

$\angle PQS = \angle PRT$. (Hence proved).

Question 9: In the Figure, if x+y = w+z, then prove that AOB is a line.

Solution 9:

To prove AOB is a straight line, we will first have to prove that x+y is a linear pair

i.e. $x+y = 180°$

We know, the angles around a point are 360° so,

$x+y+w+z = 360°$

In the question, it is given that,

$x+y = w+z$

So, $(x+y)+(x+y) = 360°$

$2(x+y) = 360°$

$\therefore (x+y) = 180°$ (Hence proved).

Question 10: In Figure, POQ is a line. The ray OR is perpendicular to the line PQ. OS is another ray lying between the rays OP and OR. Prove that $\angle ROS = \frac{1}{2} (\angle QOS – \angle POS)$.

Solution 10:

Given that ($OR \perp PQ$) and $\angle POQ = 180°$

Thus, $\angle POS + \angle ROS + \angle ROQ = 180°$

Now, $\angle POS + \angle ROS = 180° - 90°$ (As $\angle POR = \angle ROQ = 90°$)

$\therefore \angle POS + \angle ROS = 90°$

Again, ∠QOS = ∠ROQ+∠ROS

Given, ∠ROQ = 90°,

∴ ∠QOS = 90° +∠ROS

Or, ∠QOS – ∠ROS = 90°

As ∠POS + ∠ROS = 90° and ∠QOS – ∠ROS = 90°, we have

∠POS + ∠ROS = ∠QOS – ∠ROS

2 ∠ROS + ∠POS = ∠QOS

Or, ∠ROS = ½ (∠QOS – ∠POS) (Hence proved).

Question 11: In the figure, find the values of x and y and show that AB || CD.

Solution 11:

We know, a linear pair is equal to 180°.

Thus, x+50° = 180°

∴ x = 130°

We also know, vertically opposite angles are equal.

Thus, y = 130°

In the two parallel lines, the alternate interior angles are equal. Here,

x = y = 130°

This proves that the alternate interior angles are equal, and thus, AB || CD.

Question 12: In the given figure, PQ || RS and EF || QS. If ∠PQS = 60°, then find the value of ∠RFE.

Solution 12:

Given PQ || RS

Thus, ∠PQS + ∠QSR = 180°

⇒ 60° + ∠QSR = 180°

⇒ ∠QSR = 120°

Now, EF || QS ⇒ ∠RFE = ∠QSR [corresponding ∠s]

⇒ ∠RFE = 120°

Question 13: In the figure, if AB || CD, CD || EF and y : z = 3 : 7, find x.

Solution 13:

We know, AB || CD and CD||EF

Since the angles on the same side of the transversal line sum up to 180°,

x + y = 180° ——equation (i)

Also,

∠O = z (Since corresponding angles)

and, y +∠O = 180° (Since linear pair)

So, y+z = 180°

Now, let y = 3w and thus, z = 7w (As y : z = 3 : 7)

Therefore, 3w+7w = 180°

Or, 10 w = 180°

Thus, w = 18°

Now, y = 3×18° = 54°

and, z = 7×18° = 126°

Now, the angle x can be calculated from equation (i)

x+y = 180°

Or, x+54° = 180°

∴ x = 126°

Question 14: In the figure, if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.

Solution 14:

As AB || CD, GE is a transversal.

Given that ∠GED = 126°

So, ∠GED = ∠AGE = 126° (Since they are alternate interior angles)

And,

∠GED = ∠GEF + ∠FED

As EF ⊥ CD, ∠FED = 90°

∴ ∠GED = ∠GEF + 90°

Or, ∠GEF = 126° – 90° = 36°

Again, ∠FGE + ∠GED = 180° (Since transversal)

Substituting the value of ∠GED = 126° we get,

∠FGE = 54°

So,

∠AGE = 126°

∠GEF = 36° and

∠FGE = 54°

Question 15: In figure, if AB || CD. If ∠ABR = 45° and ∠ROD = 105°, then find ∠ODC.

Solution 15:

Through the point O, we draw a line 'l' parallel to AB.

⇒ line l will also be parallel to CD, then

∠1 = 45°[alternate int. angles]

∠1 + ∠2 + 105° = 180° [straight angle]

∠2 = 180° – 105° – 45°

⇒ ∠2 = 30°

Now, ∠ODC = ∠2 [alternate int. angles]

= ∠ODC = 30°

Question 16: In the figure, if PQ || ST, ∠PQR = 110° and ∠RST = 130°, find ∠QRS.

[Hint: Draw a line parallel to ST through the point R.]

Solution 16:

First, we construct a line XY parallel to PQ.

We know, the angles on the same side of the transversal are equal to 180°.

Thus, ∠PQR+∠QRX = 180°

Or, ∠QRX = 180°-110°

∴ ∠QRX = 70°

In the similar manner,

∠RST +∠SRY = 180°

Or, ∠SRY = 180°- 130°

Therefore, ∠SRY = 50°

Now, from the linear pairs on the line XY-

∠QRX+∠QRS+∠SRY = 180°

Putting the values, we have,

∠QRS = 180° – 70° – 50°

Hence, ∠QRS = 60°

Question 17: In the figure, if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find x and y.

Solution 17:

From the above diagram,

∠APQ = ∠PQR (Since Alternate interior angles)

Now, substituting the value of ∠APQ = 50° and ∠PQR = x, we ,

x = 50°

Also,

∠APR = ∠PRD (i.e., alternate interior angles)

Or, ∠APR = 127° (Given ∠PRD = 127°)

We know,

∠APR = ∠APQ+∠QPR

Now, substituting the values of ∠QPR = y and ∠APR = 127° we get,

127° = 50°+ y

Or, y = 77°

Thus, the measure of x and y are as follows:

x = 50° and y = 77°

Question 18: In the given figure, p II q, find the value of x.

Solution 18:

We extend the line p to meet RT at S.

Such that MS || QT

Now, in ARMS, we have

∠RMS = 180° – ∠PMR (Since linear pair]

= 180° – 120°

= 60°

∠RMS + ∠MSR + ∠SRM = 180° [i.e., by angle sum property of a ∆]

⇒ 60° + ∠MSR + 30o = 180°

⇒ MSR = 90°

Now, PS || QT – ∠MSR = ∠RTQ

⇒ ∠RTQ = x = MSR = 90° (Since corresponding ∠s]

Question 19: In the figure, PQ and RS are the two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.

Solution 19:

Firstly, we draw the two lines, BE and CF, such that BE ⊥ PQ and CF ⊥ RS.

Now, since PQ || RS,

So, BE || CF

We know,

The angle of incidence = Angle of reflection (By the law of reflection)

So,

∠1 = ∠2 and

∠3 = ∠4

We also know, the alternate interior angles are equal. Here, BE ⊥ CF and the transversal line BC cuts them at points B and C.

So, ∠2 = ∠3 (Since they are alternate interior angles)

Here, ∠1 +∠2 = ∠3 +∠4

Or, ∠ABC = ∠DCB

So, AB || CD (since alternate interior angles are equal)

Question 20: In figure, the sides QP and RQ of ΔPQR are produced to the points S and T, respectively. If ∠SPR = 135° and ∠PQT = 110°, find ∠PRQ.

Solution 20:

Given that TQR is a straight line, and thus, the linear pairs (i.e. ∠TQP and ∠PQR) will add up to 180°

So, ∠TQP +∠PQR = 180°

Now, substituting the value of ∠TQP = 110° we have,

∠PQR = 70°

We consider the ΔPQR,

The side QP is extended to the point S, and so ∠SPR forms the exterior angle.

Therefore, ∠SPR (∠SPR = 135°) is equal to the sum of the interior opposite angles. (By triangle property)

Or, ∠PQR +∠PRQ = 135°

Now, substituting the value of ∠PQR = 70° we get,

∠PRQ = 135°-70°

Hence, ∠PRQ = 65°

Benefits of Solving Important Questions for Class 9 Maths Chapter 6

Here are some benefits of solving Important Questions for Class 9 Maths Chapter 6, "Lines and Angles":

Strengthens Understanding: Helps reinforce key concepts related to angles and their relationships.

Improves Problem-Solving Skills: Encourages critical thinking and application of geometric theorems.

Enhances Exam Preparation: Familiarizes students with commonly asked questions, boosting confidence for assessments.

Builds a Strong Foundation: Lays the groundwork for more advanced geometry topics in higher classes.

Encourages Practice: Regular practice of Important Questions for Class 9 Maths Chapter 6 helps in retaining concepts effectively.