

NOTES

CLASS 6

MATHS

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Study Material

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UNDERSTANDING ELEMENTARY SHAPES

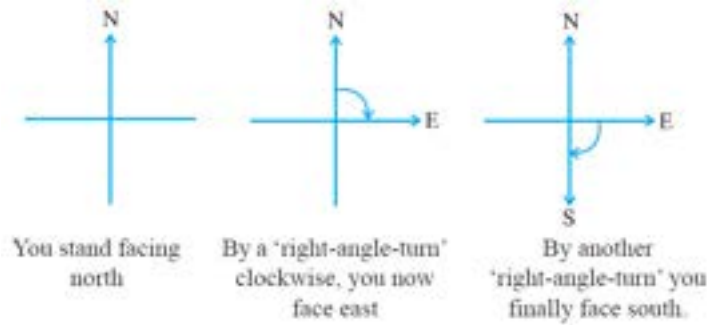
I. Important Concepts/ Result

* Measuring Line Segments

- (i) Comparison by observation
- (ii) Comparison by Tracing
- (iii) Comparison using Ruler and a Divider

• Angles – ‘Right’ and ‘Straight’

You have turned through a **right angle**.



The turn from north to east is by a **right angle**.

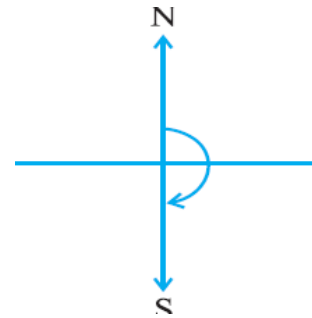
The turn from north to south is by two right angles; it

is called a **straight angle**. (NS is a straight line!)

• Angles – ‘Acute’, ‘Obtuse’ and ‘Reflex’

An angle smaller than a right angle is called an acute angle.

angles.



These **acute**



Examples of Acute angle



Roof top



Sea-saw



Opening book

If an angle is larger than a right angle, but less than a straight angle, it is called an **obtuse angle**. These are obtuse angles.

Examples of Obtuse angle



• Measuring Angles

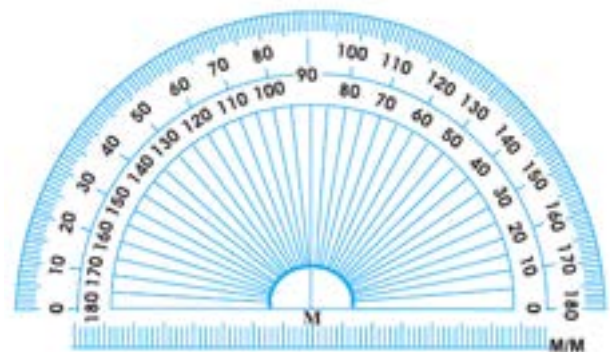
The measure of angle

We call our measure, '**degree measure**'. One complete revolution is divided into 360 equal parts. Each part is a **degree**. We write 360° to say 'three hundred sixty degrees'.

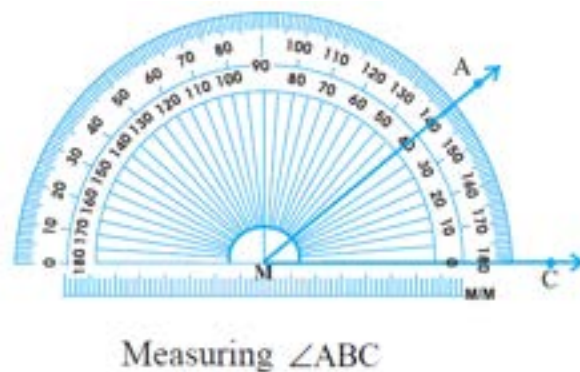
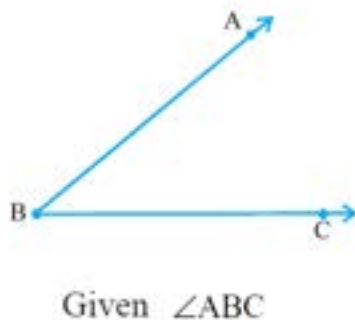
The Protractor

The curved edge is divided into 180 equal parts.

Each part is equal to a 'degree'. The markings start from 0° on the right side and ends with 180° on the left side, and vice-versa.



How to measure an angle using protractor ?



• Perpendicular Lines

When two lines intersect and the angle between them is a right angle, then the lines are said to be **perpendicular**. If a line AB is perpendicular to CD, we write **$AB \perp CD$** .

- **Examples of Perpendicular Lines**

Some examples are: the sides of a set square, the arms of a clock, the corners of the blackboard, window and the Red Cross symbol. Alphabets L and T are models for perpendicular lines.

- **Classification of Triangles**

On the basis of angles

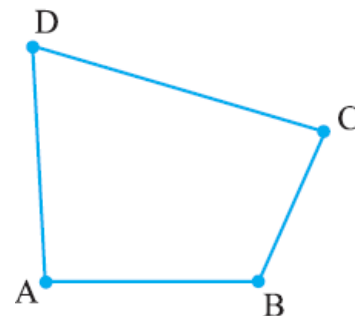
1. **Acute angled triangle:** A triangle with all angles are acute
2. **Right triangle:** A triangle whose one angle is right.
3. **Obtuse angled triangle :** A triangle whose one angle is obtuse.

On the basis of sides:

1. **Equilateral triangle**
2. **Isosceles triangle**
3. **Scalene triangle.**

- **Quadrilaterals**

- It is a polygon which has four sides
- Opposite angles $\angle A$ and $\angle C$; $\angle B$ and $\angle D$
- Opposite sides AB and CD; AD and BC
- Adjacent angles $\angle A$ and $\angle B$
- Adjacent sides AB and BC



-You have two set-squares in your instrument box. **One is $30^\circ - 60^\circ - 90^\circ$**

set-square, the other is $45^\circ - 45^\circ - 90^\circ$ set square.

-Using two or more set-squares we can make various quadrilaterals such as **RECTANGLE, SQUARE,**

PARALLELOGRAM, RHOMBUS, TRAPEZIUM

* Polygons

- it is a closed figure made of line segments only
- identify a polygon
- naming polygon

Number of sides	Name	Illustration
3	Triangle	
4	Quadrilateral	
5	Pentagon	
6	Hexagon	
8	Octagon	



II. Some illustrations/Examples (with solution) preferably of different types.

i) MCQs : 4

Question 1. A of a circle is a line segment joining any two points on the circle.

- (a) radius (b) diameter (c) circumference (d) chord

Answer: (c) circumference

Question 2.

If two lines intersect each other then the common point between them is known as point of

- (a) Contact(b) vertex(c) intersection(d) concurrence

Answer: (d) concurrence

Question 3.

Two lines in a plane either intersect exactly at one point are

(a) perpendicular(b) intersecting lines(c) equal(d) equidistant

Answer: (b) intersecting lines

Question 4.

Three or more points lying on the same line are known as points.

(a) non-collinear(b) collinear(c) intersecting(d) none of these.

Answer: (b) collinear

ii) Case based study: 1

In the given figure, name the following angles as acute, obtuse, right, straight or reflex.

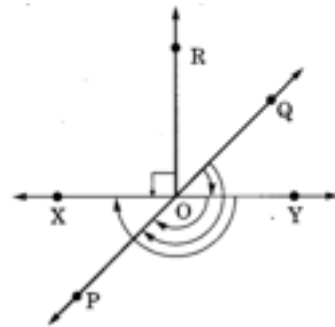
(a) $\angle QOY$ (b) $\angle YOP$ (c) $\angle ROX$ (d) $\angle QOX$ (e) $\angle POQ$

Solution:

(a) $\angle QOY$ = acute angle.(b) $\angle YOP$ = obtuse angle.

(c) $\angle ROX$ = right angle.(d) $\angle QOX$ = reflex angle.

(e) $\angle POQ$ = straight angle



iii) Short answer type question: 3

1. What is measure of right angle?

Answer : 90 degree

2. Name the triangle whose all three sides are of equal measure

Answer : Equilateral triangle

3. Name three solid shapes available I class room

Answer : chalk, duster, tube light

iv) Long answer type questions: 2

1. What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from (a) 3 to 9 (b) 4 to 7 (c) 7 to 10 (d) 12 to 9 (e) 1 to 10 (f) 6 to 3

Answer (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$ (e) $\frac{3}{4}$ (f) $\frac{3}{4}$

2. Name the types of following triangles :

- (a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.
- (b) $\triangle ABC$ with $AB = 8.7$ cm, $AC = 7$ cm and $BC = 6$ cm.
- (c) $\triangle PQR$ such that $PQ = QR = PR = 5$ cm.
- (d) $\triangle DEF$ with $m\angle D = 90^\circ$
- (e) $\triangle XYZ$ with $m\angle Y = 90^\circ$ and $XY = YZ$.
- (f) $\triangle LMN$ with $m\angle L = 30^\circ$, $m\angle M = 70^\circ$ and $m\angle N = 80^\circ$.

Answer (a) scalene triangle (b) scalene triangle (c) equilateral triangle
 (d) right triangle (e) isosceles right triangle (f) acute angled triangle

III .Questions for Practice

i) **MCQs :**

Q1.What is the angle measure for half a revolution?

- (i) 60° (ii) 90° (iii) 180° (iv) 270°

Q2.What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from 3 to 9?

- (i) $\frac{1}{2}$ (ii) $\frac{1}{3}$ (iii) $\frac{1}{4}$ (iv) $\frac{1}{5}$

Q3.Where will the hand of a clock stop if it starts at 5 & makes $\frac{1}{4}$ of a revolution, clockwise?

- (i) 7 (ii) 8 (iii) 9 (iv) 10

Q4.Which direction will you face if you start facing south & make one full revolution?

- (i) East (ii) West (iii) North (iv) South

Q5.Where will the hour hand of a clock stop if it starts from 6 & turns through one right angle?

- (i) 7 (ii) 9 (iii) 8 (iv) 10

Q6.What is the measure of a straight angle?

- (i) 75° (ii) 90° (iii) 180° (iv) 360°

Q7.What is the measure of each angle of an equilateral triangle?

- (i) 55° (ii) 70° (iii) 60° (iv) 90°

Q8 The number of right angles turned through by the hour hand of a clock when



it goes from 3 to 6 is

- (i) 1 (ii) 2 (iii) 3 (iv) 4

Q9 Where will the hour hand of a clock stop if it starts from 6 and turns through 1 right angle?

- (i) 3 (ii) 6 (iii) 9 (iv) 12

Q10 The measure of right angle is

- (i) 75° (ii) 90° (iii) 180° (iv) 360°

ii) **Short answer type question**

Q1 How many sides, angles does a triangle have?

Q2 Draw the rough sketch of the following:

- (a) Acute angle
(b) Obtuse angle

Q3 What is the measure of (i) a right angle? (ii) a straight angle?

Q4 What is reflex angle of 200° ?

Q5 Name an angle whose measure is greater than that of a right angle and less than straight angle.



Q6 Write two models for perpendicular lines

Q7 Name a triangle having three equal sides.

Q8 Name a triangle whose all three angles are acute.

Q9 Three measures of sides of triangle are 3 cm , 4 cm, 5 cm . Name the type of triangle

Q10 Name a triangle having a right angle with two sides of equal length

iii) **Long answer type questions**

1. What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from

- (a) 3 to 9 (b) 4 to 7 (c) 7 to 10 (d) 12 to 9 (e) 1 to 7 (f) 6 to 3

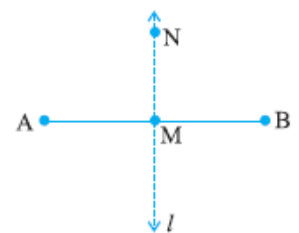
2. How many right angles do you make if you start facing
 - (a) south and turn clockwise to west?
 - (b) north and turn anti-clockwise to east?
 - (c) west and turn to west?
 - (d) south and turn to north?
3. There are two set-squares in your box. What are the measures of the angles that are formed at their corners? Do they have any angle measure that is common?
4. Name the types of following triangles :
 - (a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.
 - (b) $\triangle ABC$ with $AB = 8.7$ cm, $AC = 7$ cm and $BC = 7$ cm.
 - (c) $\triangle PQR$ such that $PQ = QR = PR = 5$ cm.
 - (d) $\triangle DEF$ with $m\angle D = 90^\circ$
 - (e) $\triangle XYZ$ with $m\angle Y = 90^\circ$ and $XY = YZ$.
 - (f) $\triangle LMN$ with $m\angle L = 30^\circ$, $m\angle M = 70^\circ$ and $m\angle N = 80^\circ$.
5. How many right angles do you make if you start facing
 - (a) south and turn clockwise to west?
 - (b) north and turn anti-clockwise to east?
 - (c) west and turn to west?
 - (d) south and turn to north?
6. Write down the measures of
 - (a) three acute angles. (b) three obtuse angles. (c) three reflex angles



Case study Questions

1. Perpendicular lines

When two lines intersect and the angle between them is a right angle, then the lines are said to be perpendicular. If a line AB is perpendicular to CD, we write $AB \perp CD$.



Perpendiculars around us!

You can give plenty of examples from things around you for perpendicular lines (or line segments). The English alphabet T is one. Is there any other alphabet which illustrates perpendicular?

Answer the following questions

- In $AB \perp CD$ what is the angle between AB and CD?
- Write two English alphabets which represent perpendicular lines.
- Is letter V model of perpendicular lines?

2. Classifications of Triangles

Triangles can be classified on the basis of sides and angles.

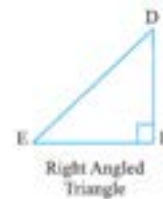
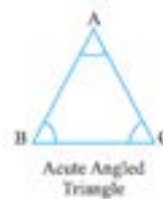
Type of Triangle on basis of angles

- Acute angled triangle : A triangle with all angles are acute
- Right triangle : A triangle with one right angle
- Obtuse angled triangle : A triangle with one angle is obtuse

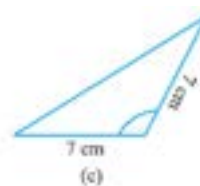
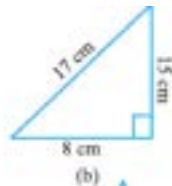
Type of Triangle on basis of sides

- Equilateral triangle :

A triangle whose all three sides are of equal measure



- Isosceles triangle : A triangle whose two sides are of equal measure
- Scalene triangle : a triangle whose all sides are of different measure



Using above information

answer the following:

- Name the triangle whose all angles are acute.
- Does a obtuse triangle has two right angles
- Name the triangle whose all sides are of equal measure
- In above fig.name triangle (b) in two different ways

Answers for practice Questions

(i) MCQ

1. (iii) 2. (i) 3. (ii) 4 (iv) 5. (ii) 6.(iii) 7.(iii) 8.(i) 9.(iii) 10.(ii)

(ii) Short answer questions

1. Number of sides : 3 Number of angles : 3
2. –
3. (i) 90° (ii) 180°
4. 160°
5. Obtuse
6. Letter T and letter L
7. Equilateral
8. Acute angled triangle
9. Scalene
10. Isosceles right triangle

(iii) Long Answer Questions

1. a. $\frac{1}{2}$ b. $\frac{1}{4}$ c. $\frac{1}{4}$ d. $\frac{3}{4}$ e. $\frac{1}{2}$ f. $\frac{3}{4}$
2. a. 1 b. 3 c. 4 d. 2
3. $90^\circ, 60^\circ, 30^\circ$ and $90^\circ, 45^\circ, 45^\circ$ common angle : 90°
4. a. scalene b. isosceles c. equilateral d. right angled triangle
- e. isosceles right triangle f. acute angled triangle
5. a. 1 b. 3 c. 4 b. 2

(iv) Case study Questions Answers

1. a. 90° b. Letter T and L c. No
2. a. acute angled triangle b. NO c. equilateral triangle d. right angled triangle and Scalene

CLASS TEST 20 MARKS



1. Say True or False :

$$5 \times 1 = 5$$

- (a) The measure of an acute angle $< 90^\circ$. (b) The measure of an obtuse angle $> 90^\circ$.
(c) The measure of a reflex angle $> 180^\circ$. (d) The measure of one complete revolution = 360° .
(e) If $m\angle A = 53^\circ$ and $m\angle B = 35^\circ$, then $m\angle A > m\angle B$.

2. Fill in the blanks with acute, obtuse, right or straight :

$$5 \times 1 = 5$$

- (a) An angle whose measure is less than that of a right angle is _____.
(b) An angle whose measure is greater than that of a right angle is _____.
(c) An angle whose measure is the sum of the measures of two right angles is _____.
(d) When the sum of the measures of two angles is that of a right angle, then each one of them is _____.
(e) When the sum of the measures of two angles is that of a straight angle and if one of them is acute then the other should be _____.

MCQ (Q 3 TO Q 7)

$$5 \times 1 = 5$$

3. What is the angle measure for half a revolution?

- (i) 600 (ii) 900 (iii) 1800 (iv) 2700

4..What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from 3 to 9?

- (i) $1/2$ (ii) $1/3$ (iii) $1/4$ (iv) $1/5$

5. Where will the hand of a clock stop if it starts at 6 & makes $1/4$ of a revolution, clockwise?

- (i) 7 (ii) 8 (iii) 9 (iv) 10

6. .Which direction will you face if you start facing north & make one full revolution?

- (i) East (ii) West (iii) North (iv) South

7. .Where will the hour hand of a clock stop if it starts from 6 & turns through one right angle?

- (i) 7 (ii) 9 (iii) 8 (iv) 10

8. What fraction of a clockwise revolution does the hour hand of a clock turn through, $1 \times 5 = 5$

when it goes from (a) 3 to 9 (b) 4 to 7 (c) 7 to 10 (d) 12 to 9 (e) 1 to 10

CLASS TEST 30 MARKS

MCQ Q1 To Q 5

5 × 1 = 5



Q1 What is the angle measure for half a revolution?

- (i) 60^0 (ii) 90^0 (iii) 180^0 (iv) 270^0

Q2.What fraction of a clockwise revolution does the hour hand of a clock turn through, when it goes from 3 to 9?

- (i) $1/2$ (ii) $1/3$ (iii) $1/4$ (iv) $1/5$

Q3.Where will the hand of a clock stop if it starts at 5 & makes $1/4$ of a revolution, clockwise?

- (i) 7 (ii) 8 (iii) 9 (iv) 10

Q4.Which direction will you face if you start facing south & make one full revolution?

- (i) East (ii) West (iii) North (iv) South

Q5.Where will the hour hand of a clock stop if it starts from 6 & turns through one right angle?

- (i) 7 (ii) 9 (iii) 8 (iv) 10

State TRUE or FALSE (Q6 To Q10)

5 × 1 = 5

Q6 The measure of an acute angle is 90° .

Q7 The measure of one complete revolution = 180° .

Q8 The measure of an obtuse angle 180° .

Q9 The measure of Right angle is more than acute angle

Q10 All sides of equilateral triangle are of equal measure.

Fill in the blanks (Q11 To Q15)

$$5 \times 1 = 5$$

Q11 The turn from north to south is by two right angles; it is called a _____.

Q12 One complete revolution is divided into _____ equal parts.

Q13 An angle whose measure is less than that of a right angle is _____.

Q14 The angle measure between the hands of the clock is _____ when time is 9 o' clock.

Q15 If all the sides in a triangle are equal, then its angles are..... .

Short answer Questions (Q16 To Q15)

$$3 \times 5 = 15$$

Q16 Draw a rough sketch of a regular hexagon. Connecting any three of its vertices, draw a triangle. Identify the type of the triangle you have drawn.

Q17 Define Equilateral, Isosceles and Scalene triangle.

Q18 Draw figures of Equilateral, Isosceles and Scalene triangle.

Q19 Name the types of following triangles :

(a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.

(b) $\triangle ABC$ with $AB = 8.7$ cm, $AC = 7$ cm and $BC = 6$ cm.

(c) $\triangle PQR$ such that $PQ = QR = PR = 5$ cm.

Q20 There are two set-squares in your box. What are the measures of the angles that are formed at their corners? Do they have any angle measure that is common?

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