

# Angles

## Exercise 11.1

### Question: 1

Give three examples of angles from your environment.

### Solution:

Three examples of angles from our environment are:

- (i) Angle formed by the minute and hour hands of an analog clock.
- (ii) Angle formed by the two adjacent walls of a room
- (iii) Angle formed by the two adjacent fingers of our hand.

### Question: 2

Write the arms and the vertex of  $\angle LMP$  given in the figure.

### Solution:

Arms of  $\angle LMP$  are MP and ML. Further, vertex is M.

### Question: 3

How many angles are formed in the figures given? Name them. (fig. from book)

### Solution:

- (i) Three angles are formed, namely  $\angle ABC$ ,  $\angle BAC$ , and  $\angle ACB$ .
- (ii) Four angles are formed, namely  $\angle ABC$ ,  $\angle ADC$ ,  $\angle BCD$ , and  $\angle BAD$ .
- (iii) Eight angles are formed namely  $\angle ADC$ ,  $\angle ACD$ ,  $\angle DAC$ ,  $\angle ACB$ ,  $\angle ABC$ ,  $\angle BAC$ ,  $\angle BCD$ , and  $\angle BAD$ .

### Question: 4

From figure, list the points which are: (fig. from book)

- (i) in the interior of  $\angle P$
- (ii) in the exterior of  $\angle P$
- (iii) lie on  $\angle P$

**Solution:**

- (i) Points J and C lie in the interior of  $\angle P$ .
- (ii) Points D and B lie in the exterior of  $\angle P$ .
- (iii) Points A, P and M lie on  $\angle P$ .

**Question: 5**

In the figure, write another name for: (fig. from book)

- (i)  $\angle 1$ .
- (ii)  $\angle 2$ .
- (iii)  $\angle 3$ .
- (iv)  $\angle 4$ .

**Solution:**

- (i) Another name for  $\angle 1$  is  $\angle BOD$ .
- (ii) Another name for  $\angle 2$  is  $\angle BOC$ .
- (iii) Another name for  $\angle 3$  is  $\angle AOC$ .
- (iv) Another name for  $\angle 4$  is  $\angle AOD$ .

**Question: 6**

In the figure, write another name for: (fig. from book)

- (i)  $\angle 1$ .
- (ii)  $\angle 2$ .
- (iii)  $\angle 3$ .

**Solution:**

- (i)  $\angle BPE$
- (ii)  $\angle PQC$
- (iii)  $\angle DQF$

**Question: 7**

In the given fig., which of the following statements are true: (fig. from book)

- (i) Point B in the interior of  $\angle AOB$
- (ii) Point B in the interior of  $\angle AOC$
- (iii) Point A in the interior of  $\angle AOD$
- (iv) Point C in the exterior of  $\angle AOB$
- (v) Point D in the exterior of  $\angle AOC$

**Solution:**

(ii), (iv) and (v) are true statements.

(i), and (iii) are incorrect statements as B lies on  $\angle AOB$  and A lies on  $\angle AOD$ .

**Question: 8**

Which of the following statements are true:

- (i) The vertex of an angle lies in its interior.
- (ii) The vertex of an angle lies in its exterior.
- (iii) The vertex of an angle lies on it.

**Solution:**

(iii) The vertex of an angle lies on it.

This is the only correct statement.

**Question: 9**

By simply looking at the pair of angles given in figure, state which of the angles in each of the pairs is greater. (fig. from book)

**Solution:**

- (i)  $\angle AOB$  is greater than  $\angle DEF$ .
- (ii)  $\angle PQR$  is greater than  $\angle LMN$ .
- (iii)  $\angle UVW$  is greater than  $\angle XYZ$ .

**Question: 10**

By using tracing paper compare the angles in each of the pairs given in figure,  
(fig. from book)

**Solution:**

Using tracing paper, we get that:

- (i)  $\angle PQR$  is greater than  $\angle AOB$ .
- (ii)  $\angle UVW$  is greater than  $\angle LMN$ .
- (iii)  $\angle RST$  is greater than  $\angle XYZ$ .
- (iv)  $\angle PQR$  is greater than  $\angle EFG$ .

## Exercise 11.2

### Question: 1

Give two examples each of right, acute and obtuse angles from your environment.

### Solution:

Two examples of right angle in our environment are:

- (i) The angle formed by the two adjacent walls of a room is a right angle.
- (ii) The angle formed by the two adjacent edges of a book is a right angle.

Two examples of acute angle in our environment are:

- (i) The angle formed between the two adjacent fingers of our hand.
- (ii) The angle between the two adjacent sides of the letter Z of English alphabet.

Two examples of obtuse angle in our environment are:

- (i) The smaller angle formed by the two adjacent blades of a fan.
- (ii) The smaller angle formed by the two sloping sides of a roof of a but is an obtuse angle.

### Question: 2

An angle is formed by two adjacent fingers. What kind of angle will it appear?

### Solution:

Angle formed by two adjacent fingers will appear as an acute angle.

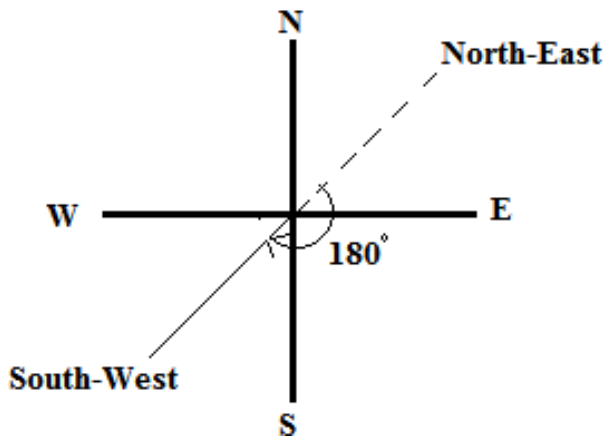
### Question: 3

Shikha is rowing a boat due northeast. In which direction will she be rowing if she turns it through:

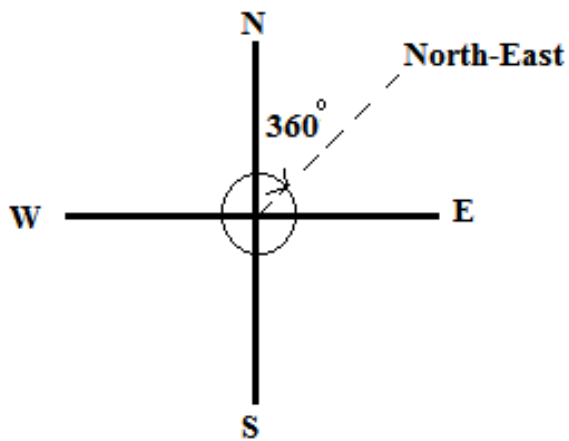
- (i) a straight angle. (ii) a complete angle.

### Solution:

- (i) If Shikha turns through a straight angle or 180 degrees, she will be rowing along the south – west direction.



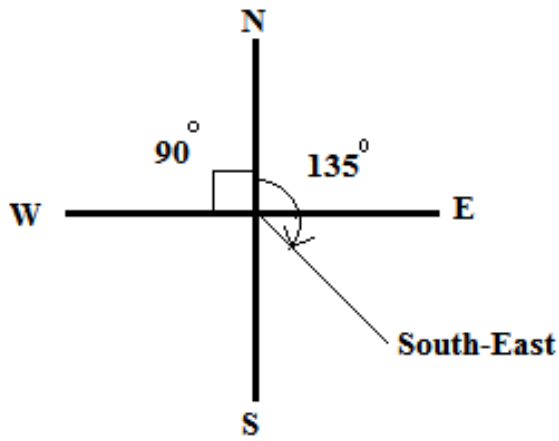
(ii) If Shikha turns through a complete angle or 360 degrees, she will be rowing along her original direction, i.e., north – east direction.



#### Question: 4

What is the measure of the angle in degrees between:

- (i) North and West?
- (ii) North and South?
- (iii) North and South – East?



**Solution:**

The measure of the angle between:

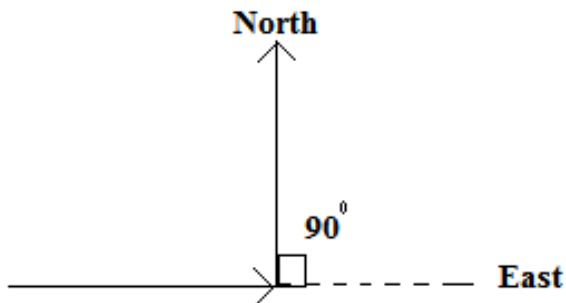
- (i) North and West is 90 degrees.
- (ii) North and South is 180 degrees.
- (iii) North and South – East is 135 degrees.

**Question: 5**

A ship sailing in river Jhelam moves towards east. If it changes to north, through what angle does it turn?

**Solution:**

If the ship is sailing in east direction and turns to north direction, it turns through an angle of 90 degrees.



**Question: 6**

You are standing in a class room facing north. In what direction are you facing after making a quarter turn?

**Solution:**

After making a quarter turn or a turn of 90 degrees, i will be facing east if i turn to my right hand. Similarly, if i turn to my left hand, i will be facing west.

**Question: 7**

A bicycle wheel makes four and a half turns. Find the number of right angles through which it turns.

**Solution:**

In one turn, the wheel of a bicycle covers  $360^\circ$ .

If we express  $360^\circ$  in right angles, we get:

$$360^\circ/90^\circ = 4 \text{ right angles.}$$

Thus, in four and a half turns, the wheel will turn by  $(4 \times 4.5) = 18$  right angles.

**Question: 8**

Look at your watch face. Through how many right angles does the minute hand moves between 8 O' clock and 10:30 O' clock?

**Solution:**

The time interval between 8: 00 O'clock and 10 : 30 O'clock is 2.5 hours, i.e., two and a half hours.

In 1 hour, the minute hand turns by a complete angle, i.e.,  $360^\circ$  or  $360^\circ/90^\circ = 4$  right angles.

Thus, in 2.5 hours, the minute hand will turn by  $2.5 \times 4 = 10$  right angles.

**Question: 9**

If a bicycle wheel has 48 spokes, then find the angle between a pair of adjacent spokes.

**Solution:**

In a bicycle, the central angle measures  $360^\circ$  and it consists of 48 spokes.

Therefore, angle between any two adjacent spokes =  $360/48 = 7.5^\circ$ .

**Question: 10**



Classify the following angles as acute, obtuse, straight, right, zero and complete angle:

(i)  $118^\circ$

(ii)  $29^\circ$

(iii)  $145^\circ$

(iv)  $165^\circ$

(v)  $0^\circ$

(vi)  $75^\circ$

(vii)  $180^\circ$

(viii)  $89.5^\circ$

(ix)  $30^\circ$

(x)  $90^\circ$

(xi)  $179^\circ$

(xii)  $360^\circ$

(xiii)  $90.5^\circ$

**Solution:**

An acute angle measures between  $0^\circ$  and  $90^\circ$ ; an obtuse angle measures between  $90^\circ$  and  $180^\circ$ ; a straight angle measures  $180^\circ$ ; a right angle measures  $90^\circ$ ; a zero angle measures  $0^\circ$  and a complete angle measures  $360^\circ$ .

(i)  $118^\circ$  is an obtuse angle.

(ii)  $29^\circ$  is an acute angle.

(iii)  $145^\circ$  is an obtuse angle.

(iv)  $165^\circ$  is an obtuse angle.

(v)  $0^\circ$  is a zero angle.

(vi)  $75^\circ$  is an acute angle.

(vii)  $180^\circ$  is a straight angle.

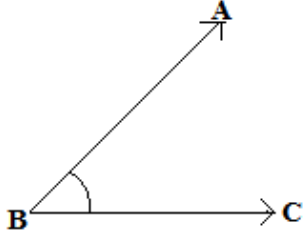
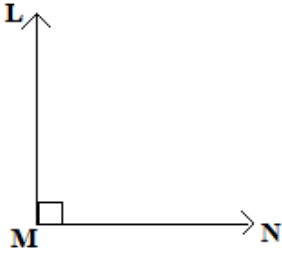
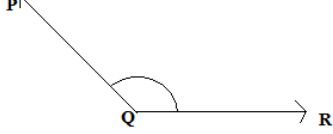
(viii)  $89.5^\circ$  is an acute angle.

- (ix)  $30^\circ$  is an acute angle.
- (x)  $90^\circ$  is a right angle.
- (xi)  $179^\circ$  is an obtuse angle.
- (xii)  $360^\circ$  is a complete angle.
- (xiii)  $90.5^\circ$  is an obtuse angle.

**Question: 11**

Using only a ruler, draw an acute angle, a right angle and an obtuse angle in your notebook and name them.

**Solution:**

		
Acute angle $\angle ABC$	Right angle $\angle LMN$	Obtuse angle $\angle PQR$

**Question: 12**

State the kind of angle, in each case, formed between the following directions:

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

**Solution:**

- (i) East and west directions form an angle of  $180^\circ$ , which is a straight angle.
- (ii) East and north directions form an angle of  $90^\circ$ , which is a right angle.
- (iii) North and north-east directions form an angle of  $45^\circ$ , which is an acute angle.

(iv) North and south-east directions form an angle of  $135^\circ$ , which is an obtuse angle.

### **Question: 13**

State the kind of each of the following angles:

#### **Solution:**

(i) Acute angle, as it measures between  $0^\circ$  and  $90^\circ$ .

(ii) Obtuse angle, as it measures between  $90^\circ$  and  $180^\circ$ .

(iii) Straight angle, as it is equal to  $180^\circ$ .

(iv) Right angle, as it is equal to  $90^\circ$ .

(v) Complete angle, as it is equal to  $360^\circ$ .

## **Objective Type Questions**

Mark the correct alternative in each of the following:

### **Question: 1**

The vertex of an angle lies

(a) in its interior (b) in its exterior (c) on the angle (d) inside the angle

#### **Solution:**

(c) on the angle.

The vertex of an angle lies on the angle.

### **Question: 2**

The figure formed by two rays with the same initial point is known as

(a) a ray (b) a line (c) an angle (d) a line segment

#### **Solution:**

(c) an angle.

An angle is a figure by two rays with the same initial point.

### **Question: 3**

An angle of measure  $0^\circ$  is called

(a) a complete angle (b) a right angle (c) a straight angle (d) none of these

**Solution:**

(d) none of these.

An angle of measure  $0^\circ$  is called a zero angle.

**Question: 4**

An angle of measure  $90^\circ$  is called

(a) a complete angle (b) a right angle (c) a straight angle (d) a reflex angle

**Solution:**

(b) a right angle.

An angle of measure  $90^\circ$  is called a right angle.

**Question: 5**

An angle of measure  $180^\circ$  is called

(a) a zero angle (b) a right angle (c) a straight angle (d) a reflex angle

**Solution:**

(c) a straight angle.

An angle of measure  $180^\circ$  is a straight angle.

**Question: 6**

An angle of measure  $360^\circ$  is called

(a) a zero angle (b) an straight angle (c) a reflex angle (d) a complete angle

**Solution:**

(d) a complete angle.

An angle of measure  $360^\circ$  is called a complete angle.

**Question: 7**

An angle of measure  $240^\circ$  is

(a) an acute angle (b) an obtuse angle (c) a straight angle (d) a complete angle

**Solution:**

None of the given options are correct.

An angle of measure  $240^\circ$  is called a reflex angle.

**Question: 8**

A reflex angle measures

(a) more than  $90^\circ$  but less than  $180^\circ$  (b) more than  $180^\circ$  but less than  $270^\circ$  (c) more than  $180^\circ$  but less than  $360^\circ$  (d) none of these.

**Solution:**

(c) more than  $180^\circ$  but less than  $360^\circ$

A reflex angle is defined as an angle that measures more than  $180^\circ$  but less than  $360^\circ$ .

**Question: 9**

The number of degrees in 2 right angles is

(a)  $90^\circ$  (b)  $180^\circ$  (c)  $270^\circ$  (d)  $360^\circ$

**Solution:**

(b)  $180^\circ$

Since, 1 right angle =  $90^\circ$

Therefore, 2 right angles =  $90^\circ \times 2 = 180^\circ$

**Question: 10**

The number of degrees in  $\frac{3}{2}$  right angles is

(a)  $180^\circ$  (b)  $360^\circ$  (c)  $270^\circ$  (d)  $90^\circ$

**Solution:**

None of the options are correct.

The correct answer is  $135^\circ$

Since, 1 right angle =  $90^\circ$

Therefore,  $3/2$  right angles =  $3/2 \times 90^\circ = 135^\circ$

**Question: 11**

If bicycle wheel has 36 spokes, then the angle between a pair of adjacent spokes is

(a)  $10^\circ$  (b)  $15^\circ$  (c)  $20^\circ$  (d)  $12^\circ$

**Solution:**

(a)  $10^\circ$

The complete angle of bicycle wheel measures is  $360^\circ$ .

Therefore, the angle between two adjacent spokes of the containing 36 spokes =  $360/36 = 10^\circ$ .