

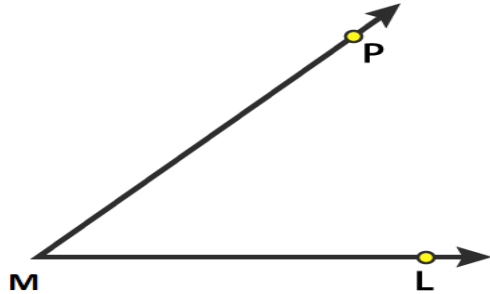
**EXERCISE 11.1**

1. Give three examples of angles from your environment.

Solution:

The three examples of angles are  
 The angle formed by the two adjacent fingers of our hand  
 The angle formed by two adjacent walls of a room  
 The angle formed by the hour hand and minute hand of a clock.

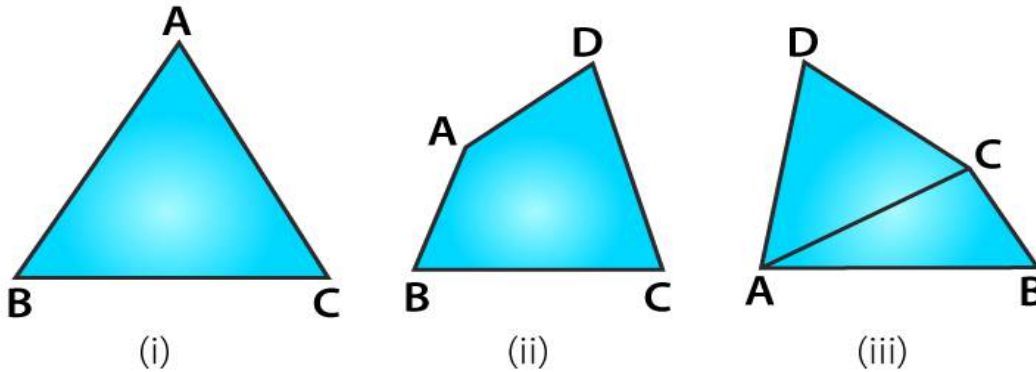
2. Write the arms and the vertex of  $\angle LMP$  given in Fig. 11.14.



Solution:

The vertex of  $\angle LMP$  is M and the arms are ML and MP.

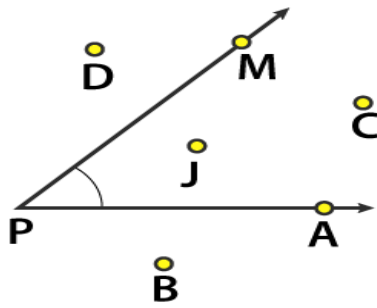
3. How many angles are formed in the figures 11.15 (i), (ii) and (iii)? Name them.



Solution:

- (i) Three angles are formed in figure (i) namely  $\angle ABC$ ,  $\angle ACB$  and  $\angle BAC$ .
- (ii) Four angles are formed in figure (ii) namely  $\angle ABC$ ,  $\angle BCD$ ,  $\angle CDA$  and  $\angle DAB$ .
- (iii) Eight angles are formed in figure (iii) namely  $\angle ABC$ ,  $\angle BCD$ ,  $\angle CDA$ ,  $\angle DAB$ ,  $\angle CAB$ ,  $\angle CAD$ ,  $\angle BCA$  and  $\angle ACD$ .

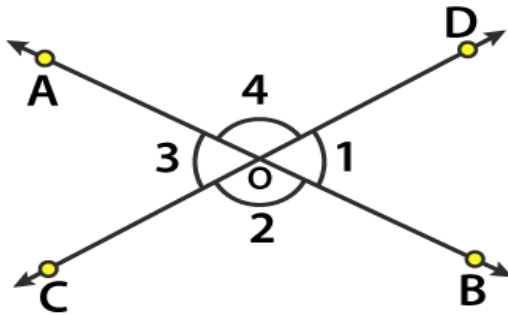
4. In Fig. 11.16, list the points which are: (i) in the interior of  $\angle P$  (ii) in the exterior of  $\angle P$  and (iii) lie on  $\angle P$ .



**Solution:**

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

**5. In Fig. 11.17, write another name for:**

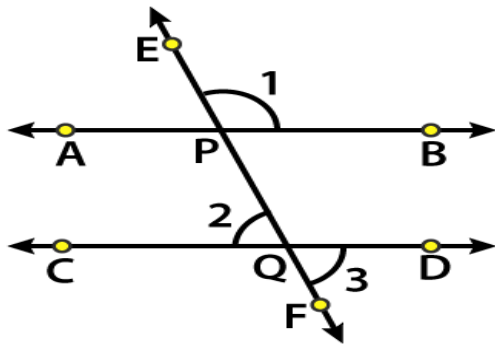


- (i)  $\angle 1$
- (ii)  $\angle 2$
- (iii)  $\angle 3$
- (iv)  $\angle 4$

**Solution:**

- (i) From the figure, another name for  $\angle 1$  is  $\angle BOD$  or  $\angle DOB$ .
- (ii) From the figure, another name for  $\angle 2$  is  $\angle BOC$  or  $\angle COB$ .
- (iii) From the figure, another name for  $\angle 3$  is  $\angle COA$  or  $\angle AOC$ .
- (iv) From the figure, another name for  $\angle 4$  is  $\angle AOD$  or  $\angle DOA$ .

**6. In Fig. 11.18, write another name for:**

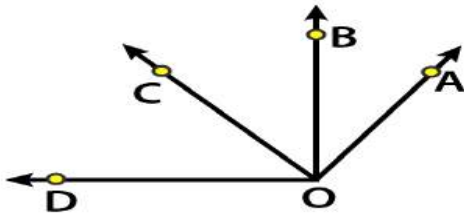


- (i)  $\angle 1$
- (ii)  $\angle 2$
- (iii)  $\angle 3$

**Solution:**

- (i) From the figure, another name for  $\angle 1$  is  $\angle EPB$  or  $\angle BPE$ .
- (ii) From the figure, another name for  $\angle 2$  is  $\angle CQP$  or  $\angle PQC$ .
- (iii) From the figure, another name for  $\angle 3$  is  $\angle DQF$  or  $\angle FQD$ .

**7. In Fig. 11.19, which of the following statements are true:**



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

**Solution:**

- (i) False. B lies on  $\angle AOB$ .
- (ii) True
- (iii) False. A lies on  $\angle AOD$ .
- (iv) True
- (v) True

**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.

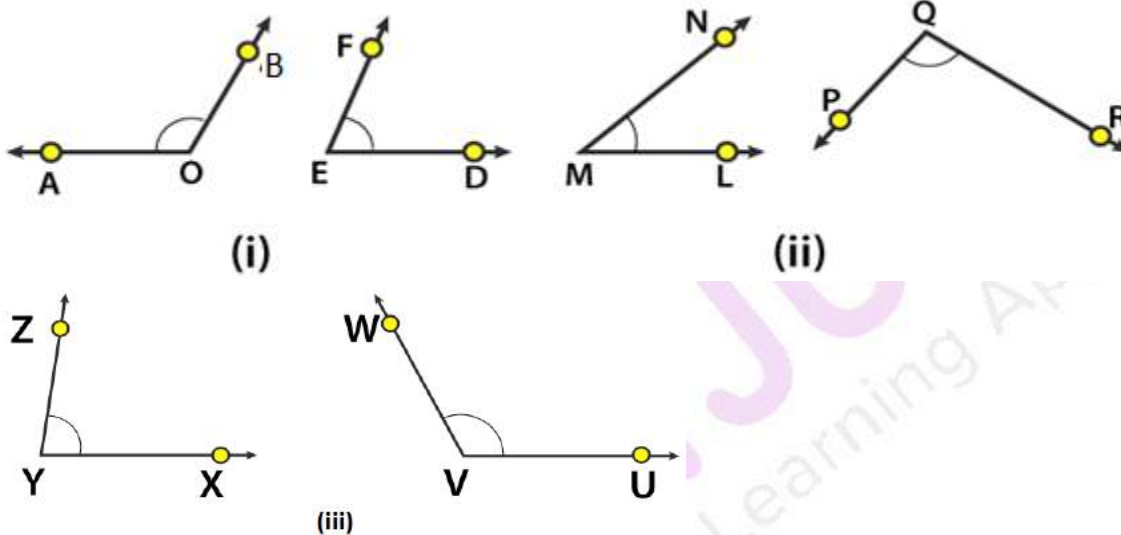
**Solution:**

(i) False.

(ii) False.

(iii) True.

9. By simply looking at the pair of angles given in Fig. 11.20, state which of the angles in each of the pairs is greater:



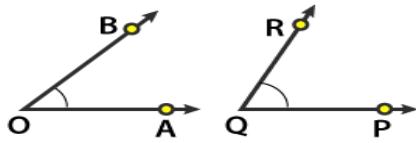
**Solution:**

(i) From the figure we know that  $\angle AOB > \angle DEF$ .

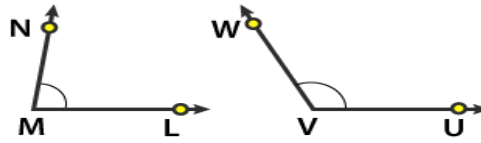
(ii) From the figure we know that  $\angle PQR > \angle LMN$ .

(iii) From the figure we know that  $\angle UVW > \angle XYZ$ .

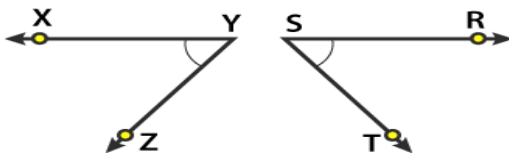
10. By using tracing paper compare the angles in each of the pairs given in Fig. 11.21.



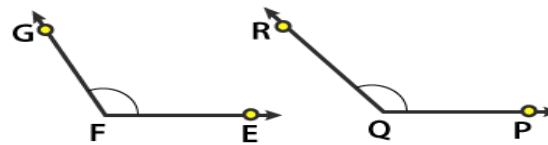
(i)



(ii)



(iii)



(iv)

**Solution:**

(i) From the figure we know that  $\angle PQR > \angle AOB$ .

(ii) From the figure we know that  $\angle UVW > \angle LMN$ .

(iii) From the figure we know that  $\angle RST > \angle XYZ$ .

(iv) From the figure we know that  $\angle PQR > \angle EFG$ .

**EXERCISE 11.2**

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

**Solution:**

The two examples of right angle are:

Two adjacent walls of a room and adjacent edges of a book

The two examples of acute angle are:

Two adjacent sides of the letter Z and two adjacent fingers of our hand.

The two examples of obtuse angles are:

Two sloping sides of a roof and two adjacent blades of a fan.

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

**Solution:**

The angle formed by two adjacent fingers will appear as acute angle.

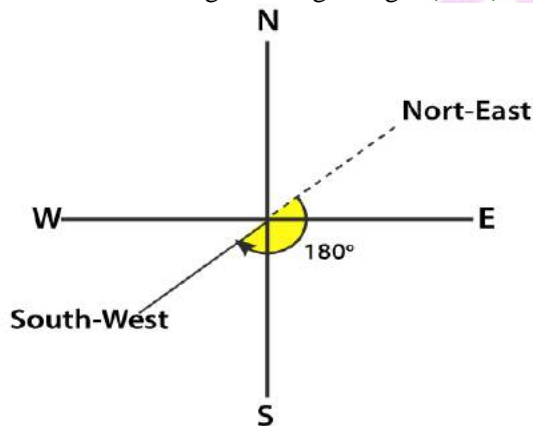
**3. Shikha is rowing a boat due north-east. In which direction will she be rowing if she turns it through:**

**(i) a straight angle**

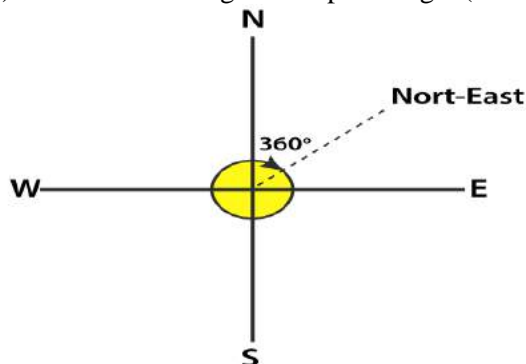
**(ii) a complete angle.**

**Solution:**

(i) If she turns through a straight angle ( $180^\circ$ ) she will be rowing in the South-West direction.



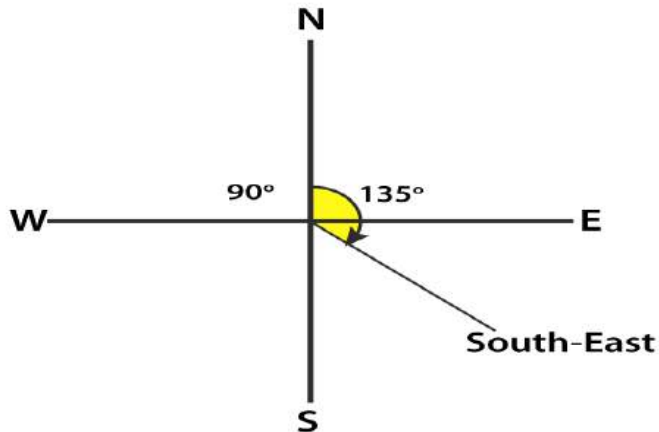
(ii) If she turns through a complete angle ( $360^\circ$ ) she will be rowing in North-East direction.



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:



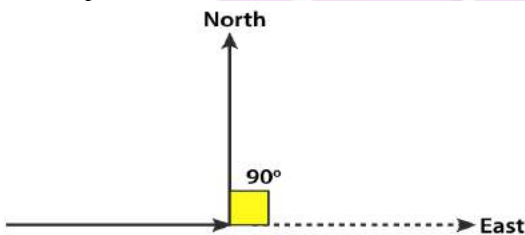
The measure of the angle in degrees between:

- (i) North and West is  $90^\circ$ .
- (ii) North and South is  $180^\circ$ .
- (iii) North and South-East is  $135^\circ$ .

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 moves from east to north direction, the angle it turns is  $90^\circ$ .



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

Solution:

By making a quarter turn ( $90^\circ$ ), I will be facing towards east if I turn to my right hand and if I turn to my left hand, I will be facing towards west.

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

Solution:

We know that the wheel of a bicycle covers  $360^\circ$  in one turn.

It can be written as

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

We know that in four and half turns the wheel turns by  $4(4.5) = 18$  right angles

Hence, the number of right angles through which it turns is 18.

**8. Look at your watch face. Through how many right angles does the minute-hand moves between 8: 00 O' clock and 10: 30 O' clock?**

**Solution:**

We know that the time interval between 8: 00 O' clock and 10: 30 O' clock is two and half hours

The minute hand turns  $360^\circ$  in 1 hour

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

So in two and half hours the minute hand turns by  $2.5(4) = 10$  right angles.

Hence, the minute hand turns by 10 right angles.

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

**Solution:**

The central angle in a bicycle is  $360^\circ$  which consists of 48 spokes.

So the angle between a pair of adjacent spokes =  $360/48 = 7.5^\circ$

Hence, the angle between a pair of adjacent spokes is  $7.5^\circ$ .

**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)  $90\frac{1}{2}^\circ$

**Solution:**

(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.

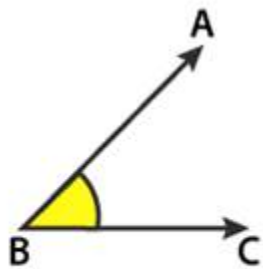
(v)  $0^\circ$  is a zero angle.



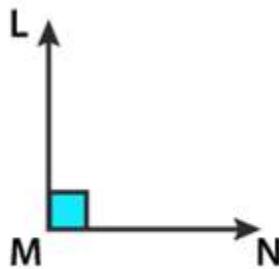
- (vi)  $75^\circ$  is an acute angle.
- (vii)  $180^\circ$  is a straight angle.
- (viii)  $89.5^\circ$  is an acute angle.
- (ix)  $30^\circ$  is an acute angle.
- (x)  $90^\circ$  is a right angle.
- (xi)  $179^\circ$  is an obtuse angle.
- (xii)  $360^\circ$  is a complete angle.
- (xiii)  $90\frac{1}{2}^\circ$  is an obtuse angle.

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

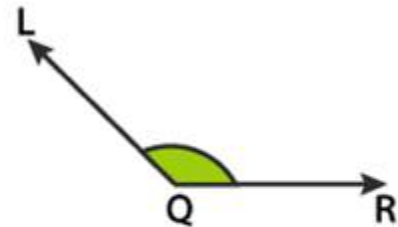
**Solution:**



Acute angle  $\angle ABC$



Right angle  $\angle LMN$



Obtuse angle  $\angle LQR$

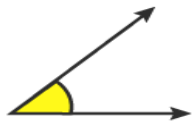
**12. State the kind of angle, in each case, formed between the following directions:**

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

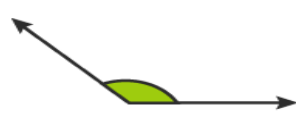
**Solution:**

- (i) East and West directions form a straight angle ( $180^\circ$ ).
- (ii) East and North directions form a right angle ( $90^\circ$ ).
- (iii) North and North-East directions form an acute angle ( $45^\circ$ ).
- (iv) North and South-East directions form an obtuse angle ( $135^\circ$ ).

**13. State the kind of each of the following angles:**



(i)



(ii)



(iii)



(iv)



(v)

**Solution:**

(i) Acute angle which measures between  $0^\circ$  and  $90^\circ$ .

(ii) Obtuse angle which measures between  $90^\circ$  and  $180^\circ$ .

(iii) Straight angle which measures  $180^\circ$ .

(iv) Right angle which measures  $90^\circ$ .

(v) Complete angle which measures  $360^\circ$ .

**OBJECTIVE TYPE QUESTIONS**

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Mark the correct alternative in each of the following:

**1. The vertex of an angles lies**

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

**Solution:**

The option (c) is the correct answer.  
The vertex of an angles lies on the angle.

**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:**

The option (c) is the correct answer.  
The figure formed by two rays with the same initial point is known as an angle.

**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:**

The option (d) is the correct answer.  
An angle of measure  $0^\circ$  is called a zero angle.

**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:**

The option (b) is the correct answer.  
An angle of measure  $90^\circ$  is called a right angle.

**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:**

The option (c) is the correct answer.  
An angle of measure  $180^\circ$  is called a straight angle.

**6. An angle of measure  $360^\circ$  is called**

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

**Solution:**

The option (d) is the correct answer.  
An angle of measure  $360^\circ$  is called a complete angle.

**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:**

There is no correct answer.  
An angle of measure  $240^\circ$  is called a reflex angle.

**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:**

The option (c) is the correct answer.  
A reflex angle measures more than  $180^\circ$  but less than  $360^\circ$ .

**9. The number of degrees in 2 right angle is**

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

**Solution:**

The option (b) is the correct answer.  
The number of degrees in 2 right angle is  $180^\circ$ .

**10. The number of degrees in  $3/2$  right angles is**

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

**Solution:**

There is no correct answer.

One right angle =  $90^\circ$

So  $3/2$  right angles =  $3/2 (90^\circ) = 135^\circ$

**11. If a 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:**

The option (a) is the correct answer.

The central angle of a bicycle wheel measures  $360^\circ$

The angle between a pair of adjacent spokes of the wheel which has 36 spokes =  $360/36 = 10^\circ$

