

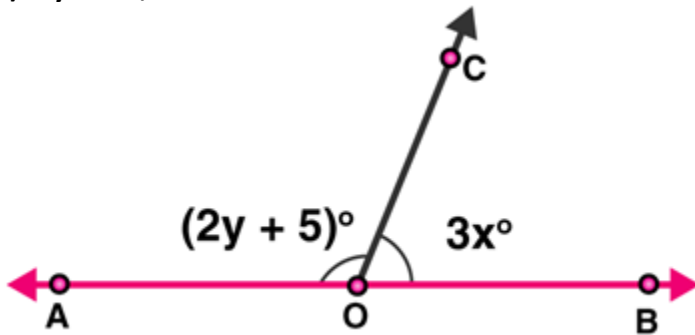
Exercise 8.2

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Question 1: In the below Fig. OA and OB are opposite rays:

(i) If $x = 25^\circ$, what is the value of y ?

(ii) If $y = 35^\circ$, what is the value of x ?



Solution:

(i) Given: $x = 25$

From figure: $\angle AOC$ and $\angle BOC$ form a linear pair

Which implies, $\angle AOC + \angle BOC = 180^\circ$

From the figure, $\angle AOC = 2y + 5$ and $\angle BOC = 3x$

$$\angle AOC + \angle BOC = 180^\circ$$

$$(2y + 5) + 3x = 180$$

$$(2y + 5) + 3(25) = 180$$

$$2y + 5 + 75 = 180$$

$$2y + 80 = 180$$

$$2y = 100$$

$$y = 100/2 = 50$$

Therefore, $y = 50^\circ$.Answer!!

(ii) Given: $y = 35^\circ$

From figure: $\angle AOC + \angle BOC = 180^\circ$ (Linear pair angles)

$$(2y + 5) + 3x = 180$$

$$(2(35) + 5) + 3x = 180$$

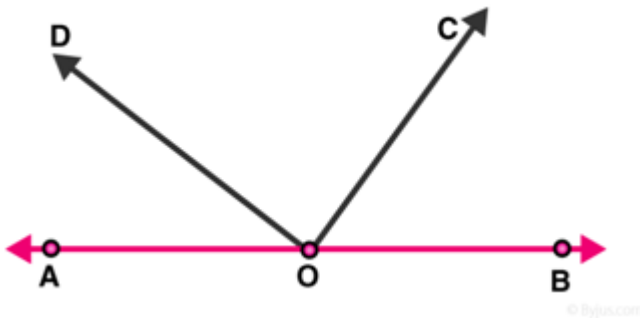
$$75 + 3x = 180$$

$$3x = 105$$

$$x = 35$$

Therefore, $x = 35^\circ$

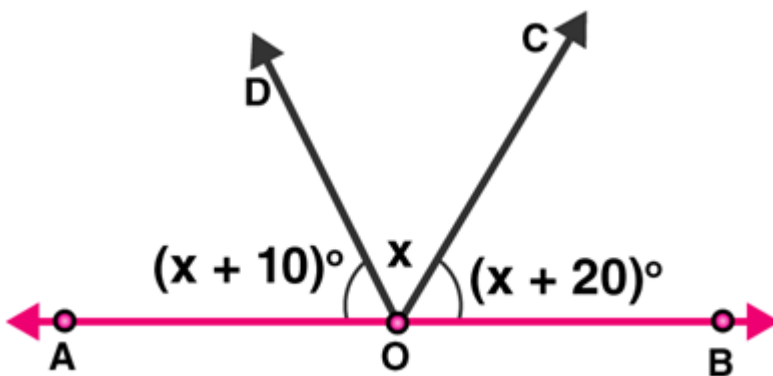
Question 2: In the below figure, write all pairs of adjacent angles and all the linear pairs.



Solution: From figure, pairs of adjacent angles are :
 $(\angle AOC, \angle COB)$; $(\angle AOD, \angle BOD)$; $(\angle AOD, \angle COD)$; $(\angle BOC, \angle COD)$

And Linear pair of angles are $(\angle AOD, \angle BOD)$ and $(\angle AOC, \angle BOC)$.
 [As $\angle AOD + \angle BOD = 180^\circ$ and $\angle AOC + \angle BOC = 180^\circ$.]

Question 3 : In the given figure, find x . Further find $\angle BOC$, $\angle COD$ and $\angle AOD$.



Solution:

From figure, $\angle AOD$ and $\angle BOD$ form a linear pair,
 Therefore, $\angle AOD + \angle BOD = 180^\circ$

Also, $\angle AOD + \angle BOC + \angle COD = 180^\circ$

Given: $\angle AOD = (x+10)^\circ$, $\angle COD = x^\circ$ and $\angle BOC = (x + 20)^\circ$

$$(x + 10) + x + (x + 20) = 180$$

$$3x + 30 = 180$$

$$3x = 180 - 30$$

$$x = 150/3$$

$$x = 50^\circ$$

Now,

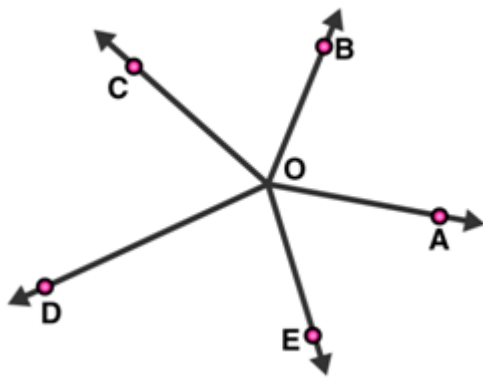
$$\angle AOD = (x+10) = 50 + 10 = 60$$

$$\angle COD = x = 50$$

$$\angle BOC = (x+20) = 50 + 20 = 70$$

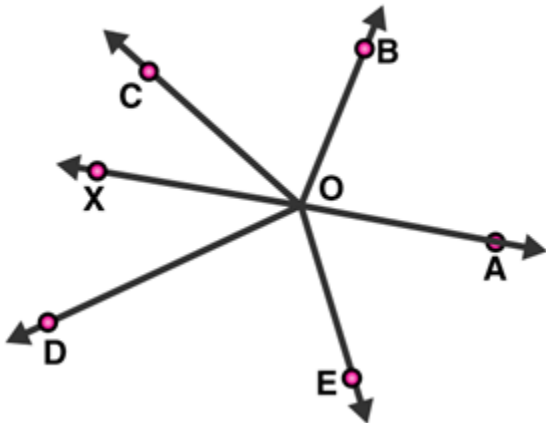
Hence, $\angle AOD = 60^\circ$, $\angle COD = 50^\circ$ and $\angle BOC = 70^\circ$

Question 4: In figure, rays OA, OB, OC, OD and OE have the common end point O. Show that $\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360^\circ$.



Solution:

Given: Rays OA, OB, OC, OD and OE have the common endpoint O.
Draw an opposite ray OX to ray OA, which make a straight line AX.



From figure:

$\angle AOB$ and $\angle BOX$ are linear pair angles, therefore,

$$\angle AOB + \angle BOX = 180^\circ$$

$$\text{Or, } \angle AOB + \angle BOC + \angle COX = 180^\circ \text{ -----(1)}$$

Also,

$\angle AOE$ and $\angle EOX$ are linear pair angles, therefore,

$$\angle AOE + \angle EOX = 180^\circ$$

$$\text{Or, } \angle AOE + \angle DOE + \angle DOX = 180^\circ \quad \text{---(2)}$$

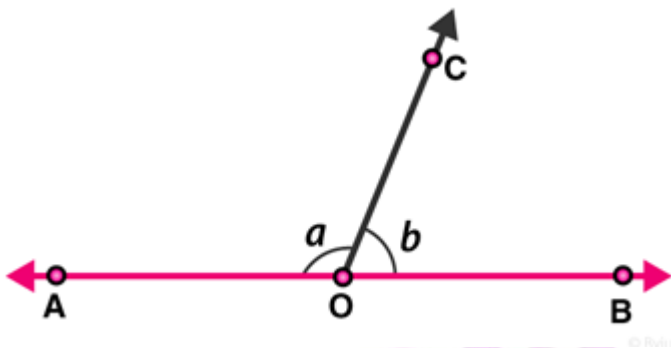
By adding equations, (1) and (2), we get;

$$\angle AOB + \angle BOC + \angle COF + \angle AOE + \angle DOF + \angle DOE = 180^\circ + 180^\circ$$

$$\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360^\circ$$

Hence Proved.

Question 5 : In figure, $\angle AOC$ and $\angle BOC$ form a linear pair. If $a - 2b = 30^\circ$, find a and b ?



Solution:

Given : $\angle AOC$ and $\angle BOC$ form a linear pair.

$$\Rightarrow a + b = 180^\circ \quad \dots(1)$$

$$a - 2b = 30^\circ \quad \dots(2) \text{ (given)}$$

On subtracting equation (2) from (1), we get

$$a + b - a + 2b = 180 - 30$$

$$3b = 150$$

$$b = 150/3$$

$$b = 50^\circ$$

Since, $a - 2b = 30^\circ$

$$a - 2(50) = 30$$

$$a = 30 + 100$$

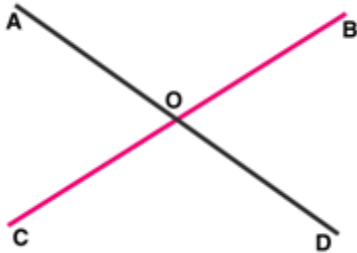
$$a = 130^\circ$$

Therefore, the values of a and b are 130° and 50° respectively.

Question 6: How many pairs of adjacent angles are formed when two lines intersect at a point?

Solution: Four pairs of adjacent angles are formed when two lines intersect each other at a single point.

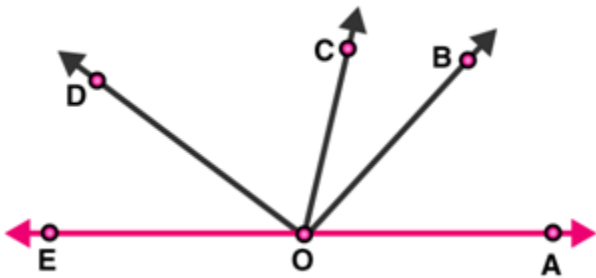
For example, Let two lines AB and CD intersect at point O.



The 4 pair of adjacent angles are :

$(\angle AOD, \angle DOB), (\angle DOB, \angle BOC), (\angle COA, \angle AOD)$ and $(\angle BOC, \angle COA)$.

Question 7: How many pairs of adjacent angles, in all, can you name in figure given?



Solution: Number of Pairs of adjacent angles, from the figure, are :

$\angle EOC$ and $\angle DOC$

$\angle EOD$ and $\angle DOB$

$\angle DOC$ and $\angle COB$

$\angle EOD$ and $\angle DOA$

$\angle DOC$ and $\angle COA$

$\angle BOC$ and $\angle BOA$

$\angle BOA$ and $\angle BOD$

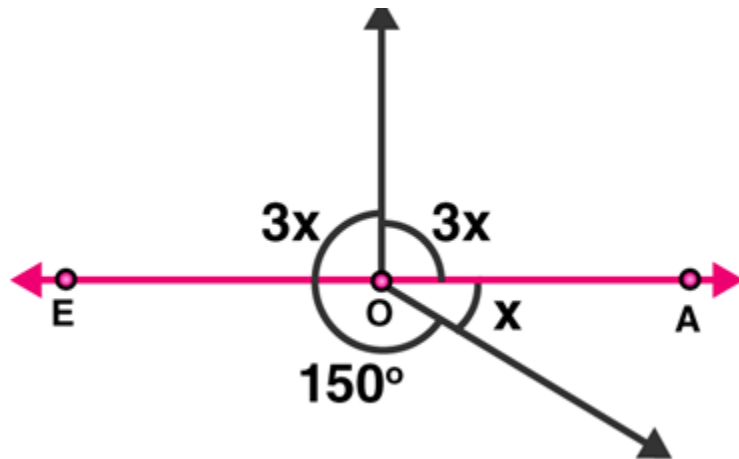
$\angle BOA$ and $\angle BOE$

$\angle EOC$ and $\angle COA$

$\angle EOC$ and $\angle COB$

Hence, there are 10 pairs of adjacent angles.

Question 8: In figure, determine the value of x.



Solution:

The sum of all the angles around a point O is equal to 360° .

Therefore,

$$3x + 3x + 150 + x = 360^\circ$$

$$7x = 360^\circ - 150^\circ$$

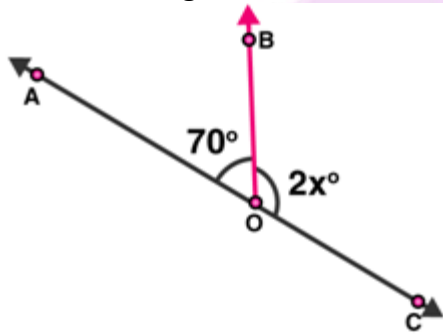
$$7x = 210^\circ$$

$$x = 210/7$$

$$x = 30^\circ$$

Hence, the value of x is 30° .

Question 9: In figure, AOC is a line, find x.



Solution:

From the figure, $\angle AOB$ and $\angle BOC$ are linear pairs,

$$\angle AOB + \angle BOC = 180^\circ$$

$$70 + 2x = 180$$

$$2x = 180 - 70$$

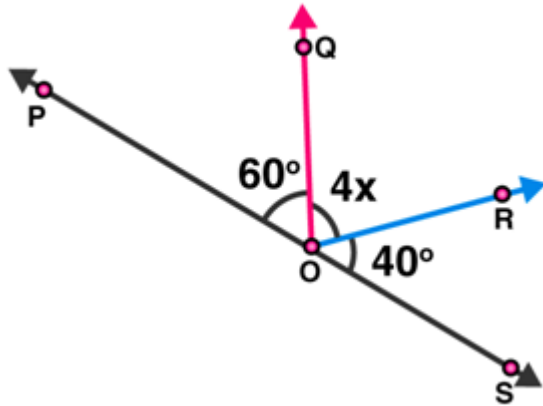
$$2x = 110$$

$$x = 110/2$$

$$x = 55$$

Therefore, the value of x is 55° .

Question 10: In figure, POS is a line, find x.



Solution:

From figure, $\angle POQ$ and $\angle QOS$ are linear pairs.

Therefore,

$$\angle POQ + \angle QOS = 180^\circ$$

$$\angle POQ + \angle QOR + \angle ROS = 180^\circ$$

$$60^\circ + 4x + 40^\circ = 180^\circ$$

$$4x = 180^\circ - 100^\circ$$

$$4x = 80^\circ$$

$$x = 20^\circ$$

Hence, the value of x is 20° .