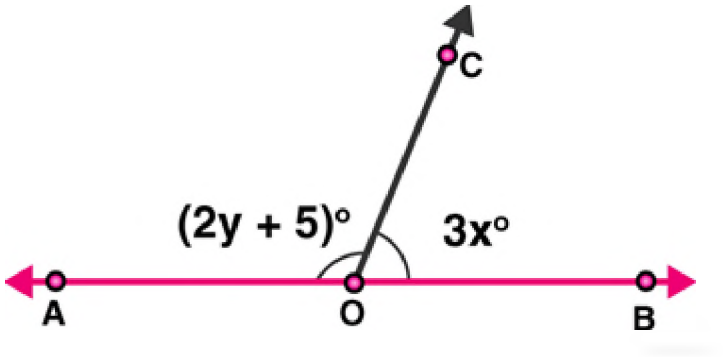
Exercise 8.2

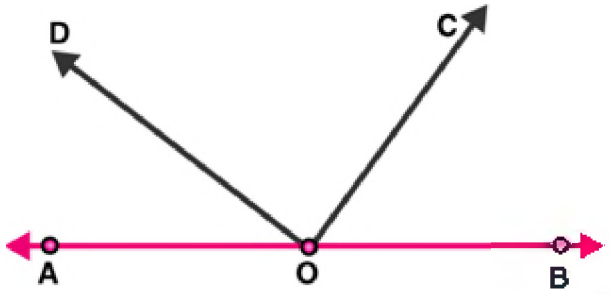
Question 1: In the below Fig. OA and OB are opposite rays:
(i) If x = 25^0, what is the value of y?
(ii) If y = 35^0, what is the value of x?



Solution:
(i) Given: x = 25
From figure: ∠AOC and ∠BOC form a linear pair
Which implies, ∠AOC + ∠BOC = 180^0
From the figure, ∠AOC = 2y + 5 and ∠BOC = 3x
∠AOC + ∠BOC = 180^0
(2y + 5) + 3x = 180
(2y + 5) + 3 (25) = 180
2y + 5 + 75 = 180
2y + 80 = 180
2y = 100
y = 100/2 = 50
Therefore, y = 50^0 .Answer!!

(ii) Given: y = 35^0
From figure: ∠AOC + ∠BOC = 180° (Linear pair angles)
(2y + 5) + 3x = 180
(2(35) + 5) + 3x = 180
75 + 3x = 180
3x = 105
x = 35
Therefore, x = 35^0

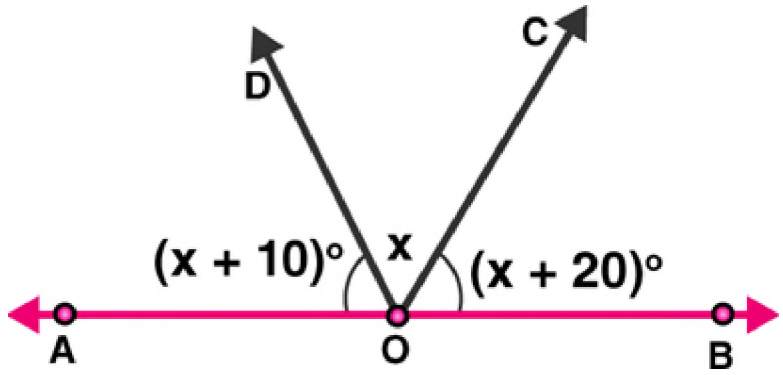
Question 2: In the below figure, write all pairs of adjacent angles and all the linear pairs.



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

And Linear pair of angles are (∠AOD, ∠BOD) and (∠AOC, ∠BOC).
[As ∠AOD + ∠BOD = 180^0 and ∠AOC+ ∠BOC = 180^0.]

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



Solution:
From figure, ∠AOD and ∠BOD form a linear pair,
Therefore, ∠AOD+ ∠BOD = 180^0

Also, ∠AOD + ∠BOC + ∠COD = 180^0

Given: ∠AOD = $(x+10)^0$, ∠COD = x^0 and ∠BOC = $(x + 20)^0$

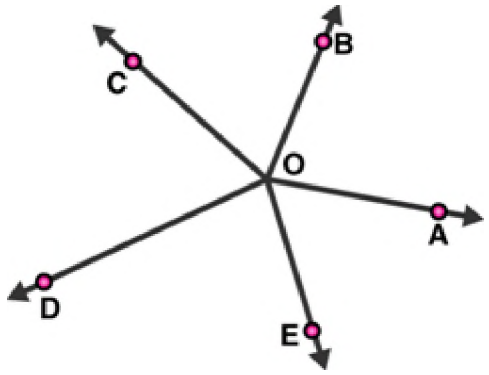
(x + 10) + x + (x + 20) = 180
3x + 30 = 180
3x = 180 – 30

x = 150/3
x = 50^0

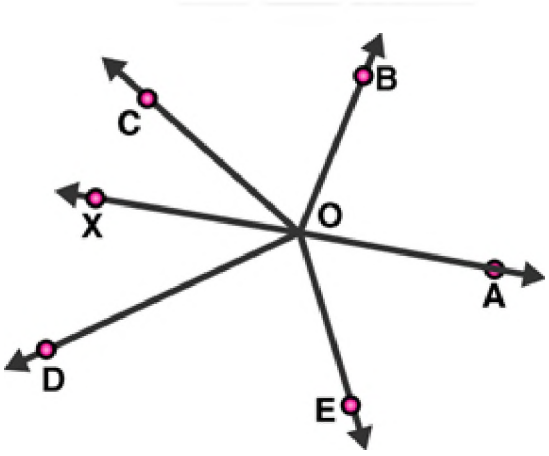
Now,
∠AOD=(x+10) =50 + 10 = 60
∠COD = x = 50
∠BOC = (x+20) = 50 + 20 = 70

Hence, ∠AOD=60^0, ∠COD=50^0 and ∠BOC=70^0

Question 4: In figure, rays OA, OB, OC, OD and OE have the common end point 0. Show that ∠AOB+∠BOC+∠COD+∠DOE+∠EOA=360°.



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.



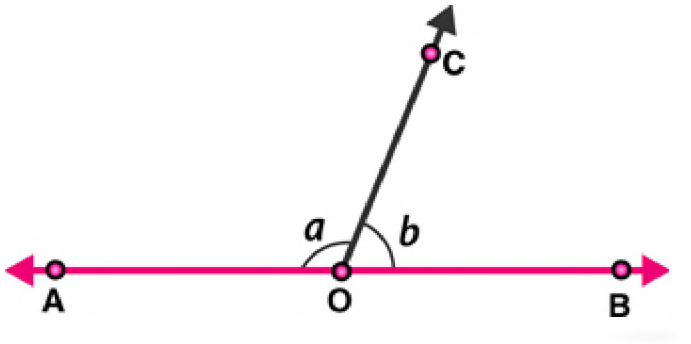
From figure:
∠AOB and ∠BOX are linear pair angles, therefore,
∠AOB +∠BOX = 180^0
Or, ∠AOB + ∠BOC + ∠COX = 180^0 ———(1)

Also,
∠AOE and ∠EOX are linear pair angles, therefore,
∠AOE+∠EOX =180°
Or, ∠AOE + ∠DOE + ∠DOX = 180^0 ——(2)

By adding equations, (1) and (2), we get;
∠AOB + ∠BOC + ∠COF + ∠AOE + ∠DOF + ∠DOE = 180^0 + 180^0
∠AOB + ∠BOC + ∠COD + ∠DOE + ∠EOA = 360^0

Hence Proved.

Question 5 : In figure, ∠AOC and ∠BOC form a linear pair. If a – 2b = 30°, find a and b?

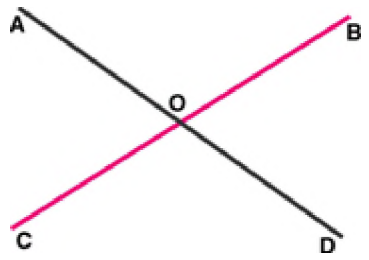


Solution:
Given : ∠AOC and ∠BOC form a linear pair.
=> a + b = 180^0 .....(1)
a – 2b = 30^0 ...(2) (given)

On subtracting equation (2) from (1), we get
a + b – a + 2b = 180 – 30
3b = 150
b = 150/3
b = 50^0
Since, a – 2b = 30^0
a – 2(50) = 30
a = 30 + 100
a = 130^0
Therefore, the values of a and b are 130° and 50° respectively.

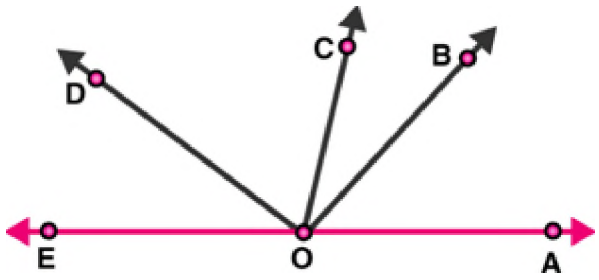
Question 6: How many pairs of adjacent angles are formed when two lines intersect at a point?
Solution: Four pairs of adjacent angles are formed when two lines intersect each other at a single point.

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



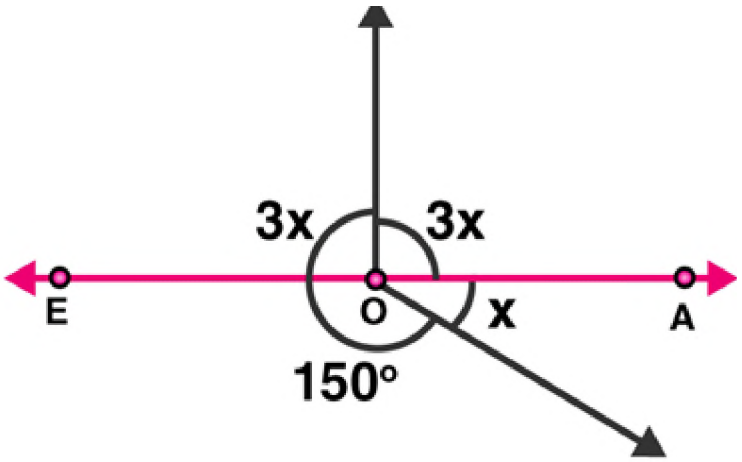
The 4 pair of adjacent angles are :
(∠AOD,∠DOB),(∠DOB,∠BOC),(∠COA, ∠AOD) and (∠BOC,∠COA).

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 :
∠EOC and ∠DOC
∠EOD and ∠DOB
∠DOC and ∠COB
∠EOD and ∠DOA
∠DOC and ∠COA
∠BOC and ∠BOA
∠BOA and ∠BOD
∠BOA and ∠BOE
∠EOC and ∠COA
∠EOC and ∠COB
Hence, there are 10 pairs of adjacent angles.

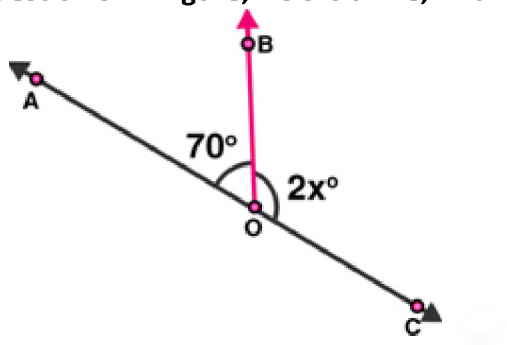
Question 8: In figure, determine the value of x.



Solution:

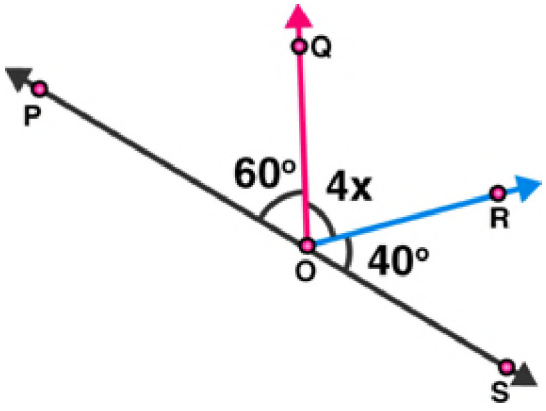
The sum of all the angles around a point O is equal to 360°.
Therefore,
$3x + 3x + 150 + x = 360^0$
$7x = 360^0 – 150^0$
$7x = 210^0$
$x = 210/7$
$x = 30^0$
Hence, the value of x is 30°.

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



Solution:
From the figure, ∠AOB and ∠BOC are linear pairs,
∠AOB +∠BOC =180°
70 + 2x = 180
2x = 180 – 70
2x = 110
x = 110/2
x = 55
Therefore, the value of x is 55^0.

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



Solution:

From figure, ∠POQ and ∠QOS are linear pairs.

Therefore,

$\angle POQ + \angle QOS = 180^0$

$\angle POQ + \angle QOR + \angle SOR = 180^0$

$60^0 + 4x + 40^0 = 180^0$

$4x = 180^0 - 100^0$

$4x = 80^0$

$x = 20^0$

Hence, the value of x is 20^0.