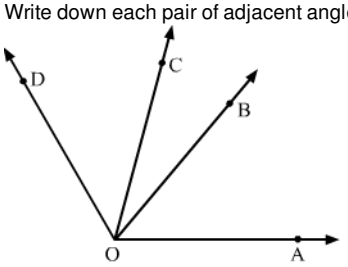
Question:1

Write down each pair of adjacent angles shown in Fig.



Solution:

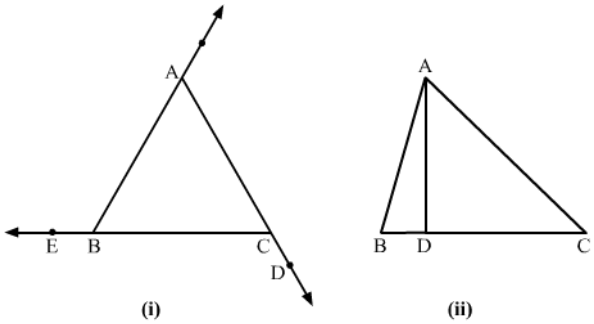
Adjacent angles are the angles that have a common vertex and a common arm.

Following are the adjacent angles in the given figure:

$\angle DOC$ and $\angle BOC \angle COB$ and $\angle BOA$

Question:2

In Fig., name all the pairs of adjacent angles.



Solution:

In figure i, the adjacent angles are:

$\angle \mathrm{EBA}$ and $\angle \mathrm{ABC} \angle \mathrm{ACB}$ and $\angle \mathrm{BCF} \angle \mathrm{BAC}$ and $\angle \mathrm{CAD}$

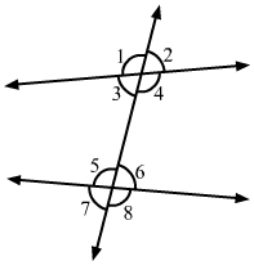
In figure ii, the adjacent angles are:

$\angle$BAD and $\angle$DAC

$\angle$BDA and $\angle$CDA

Question:3

In figure, write down: i each linear pair ii each pair of vertically opposite angles.



Solution:

i Two adjacent angles are said to form a linear pair of angles if their non-common arms are two opposite rays.

$\angle$1 and $\angle$3

$\angle$1 and $\angle$2

$\angle$4 and $\angle$3

$\angle$4 and $\angle$2

$\angle$5 and $\angle$6

$\angle$5 and $\angle$7

$\angle$6 and $\angle$8

$\angle$7 and $\angle$8

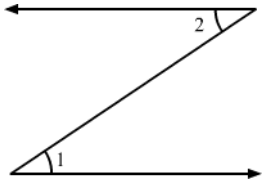
ii Two angles formed by two intersecting lines having no common arms are called vertically opposite angles.

$\angle$1 and $\angle$4

$\angle 2$ and $\angle 3$
$\angle 5$ and $\angle 8$
$\angle 6$ and $\angle 7$

Question:4

Are the angles 1 and 2 given in Fig. adjacent angles?



Solution:

No, because they have no common vertex.

Question:5

Find the complement of each of the following angles:

i 35°

ii 72°

iii 45°

iv 85°

Solution:

Two angles are called complementary angles if the sum of those angles is 90°.

Complementary angles of the following angles are:

$(\mathrm{i})\ 90^\circ - 35^\circ = 55^\circ\ (\mathrm{ii})\ 90^\circ - 72^\circ = 18^\circ\ (\mathrm{iii})\ 90^\circ - 45^\circ = 45^\circ\ (\mathrm{iv})\ 90^\circ - 85^\circ = 5^\circ$

Question:6

Find the supplement of each of the following angles:

i 70°

ii 120°

iii 135°

iv 90°

Solution:

Two angles are called supplementary angles if the sum of those angles is 180°.

Supplementary angles of the following angles are:

i 180° – 70° = 110°

ii 180° – 120° = 60°

iii 180° – 135° = 45°

iv 180° – 90° = 90°

Question:7

Identify the complementary and supplementary pairs of angles from the following pairs:

i 25°, 65°

ii 120°, 60°

iii 63°, 27°

iv 100°, 80°

Solution:

Since
$(\mathrm{i})\ 25^\circ + 65^\circ = 90^\circ$, therefore this is complementary pair of angle. $(\mathrm{ii})\ 120^\circ + 60^\circ = 180^\circ$, therefore this is supplementary pair of angle. (iii) 6

Therefore, i and iii are the pairs of complementary angles and ii and iv are the pairs of supplementary angles.

Question:8

Can two angles be supplementary, if both of them be

i obtuse?

ii right?

iii acute?

Solution:

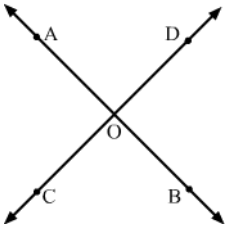
i No, two obtuse angles cannot be supplementary.

ii Yes, two right angles can be supplementary. ($\because \angle 90^\circ + \angle 90^\circ = \angle 180^\circ$)

iii No, two acute angles cannot be supplementary.

Question:9

Name the four pairs of supplementary angles shown in Fig.



Solution:

Following are the supplementary angles:

∠AOC and ∠COB

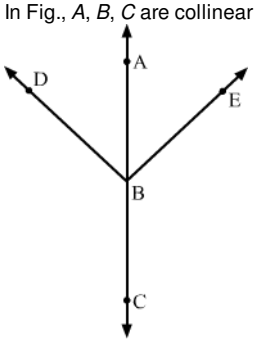
∠BOC and ∠DOB

∠BOD and ∠DOA

∠AOC and ∠DOA

Question:10

In Fig., *A*, *B*, *C* are collinear points and ∠*DBA* = ∠*EBA*.



i Name two linear pairs

ii Name two pairs of supplementary angles.

Solution:

i Linear pairs:

∠ABD and ∠DBC

∠ABE and ∠EBC

Because every linear pair forms supplementary angles, these angles are:

∠ABD and ∠DBC

∠ABE and ∠EBC

Question:11

If two supplementary angles have equal measure, what is the measure of each angle?

Solution:

Let *x* and *y* be two supplementary angles that are equal.

$\angle x = \angle y$

According to the question,

$\angle x + \angle y = 180^\circ \Rightarrow \angle x + \angle x = 180^\circ \Rightarrow 2\angle x = 180^\circ \Rightarrow \angle x = \frac{180^\circ}{2} = 90^\circ \therefore \angle x = \angle y = 90^\circ$

Question:12

If the complement of an angle is 28°, then find the supplement of the angle.

Solution:

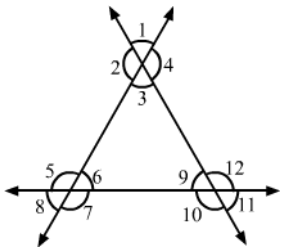
Let *x* be the complement of the given angle 28°.

$\therefore\ \angle x + 28^\circ = 90^\circ \Rightarrow \angle x = 90^\circ - 28^\circ = 62^\circ$

So, supplement of the angle = $180^\circ - 62^\circ = 118^\circ$

Question:13

In Fig. 19, name each linear pair and each pair of vertically opposite angles:



Solution:

Two adjacent angles are said to form a linear pair of angles if their non-common arms are two opposite rays.

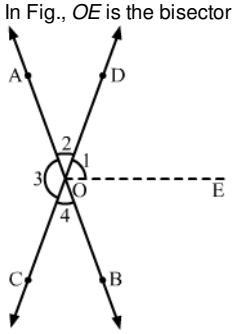
$\angle 1$ and $\angle 2$
$\angle 2$ and $\angle 3$
$\angle 3$ and $\angle 4$
$\angle 1$ and $\angle 4$
$\angle 5$ and $\angle 6$
$\angle 6$ and $\angle 7$
$\angle 7$ and $\angle 8$
$\angle 8$ and $\angle 5$
$\angle 9$ and $\angle 10$
$\angle 10$ and $\angle 11$
$\angle 11$ and $\angle 12$
$\angle 12$ and $\angle 9$

Two angles formed by two intersecting lines having no common arms are called vertically opposite angles.

$\angle 1$ and $\angle 3$
$\angle 4$ and $\angle 2$
$\angle 5$ and $\angle 7$
$\angle 6$ and $\angle 8$
$\angle 9$ and $\angle 11$
$\angle 10$ and $\angle 12$

Question:14

In Fig., *OE* is the bisector of $\angle BOD$. If $\angle 1 = 70°$, find the magnitudes of $\angle 2$, $\angle 3$ and $\angle 4$.



Solution:

Since OE is the bisector of $\angle BOD$,

$\therefore \angle DOE = \angle EOB \angle 2 + \angle 1 + \angle EOB = 180^\circ \quad (\text{Linear Pair}) \angle 2 + 2\angle 1 = 180^\circ \quad (\angle 1 = \angle EOB) \Rightarrow \angle 2 = 180^\circ - 2\angle 1 = 180^\circ - 2 \times 70^\circ = 180$
$\angle 4 = \angle 2 = 40^\circ \quad (\text{Vertically opposite angles}) \angle 3 = \angle DOB = \angle 1 + \angle EOB = 70^\circ + 70^\circ = 140^\circ \quad [\angle 3 = \angle DOB \text{ (Vertically opposite angles)}$

Question:15

One of the angles forming a linear pair is a right angle. What can you say about its other angle?

Solution:

One angle of a linear pair is the right angle, i.e., 90°.

∴ The other angle = 180° - 90° = 90°

Question:16

One of the angles forming a linear pair is an obtuse angle. What kind of angle is the other?

Solution:

If one of the angles of a linear pair is obtuse, then the other angle should be acute; only then can their sum be 180°.

Question:17

One of the angles forming a linear pair is an acute angle. What kind of angle is the other?

Solution:

In a linear pair, if one angle is acute, then the other angle should be obtuse. Only then their sum can be 180°.

Question:18

Can two acute angles form a linear pair?

Solution:

No, two acute angles cannot form a linear pair because their sum is always less than 180°.

Question:19

If the supplement of an angle is 65°; then find its complement.

Solution:

Let *x* be the required angle.

Then, we have:

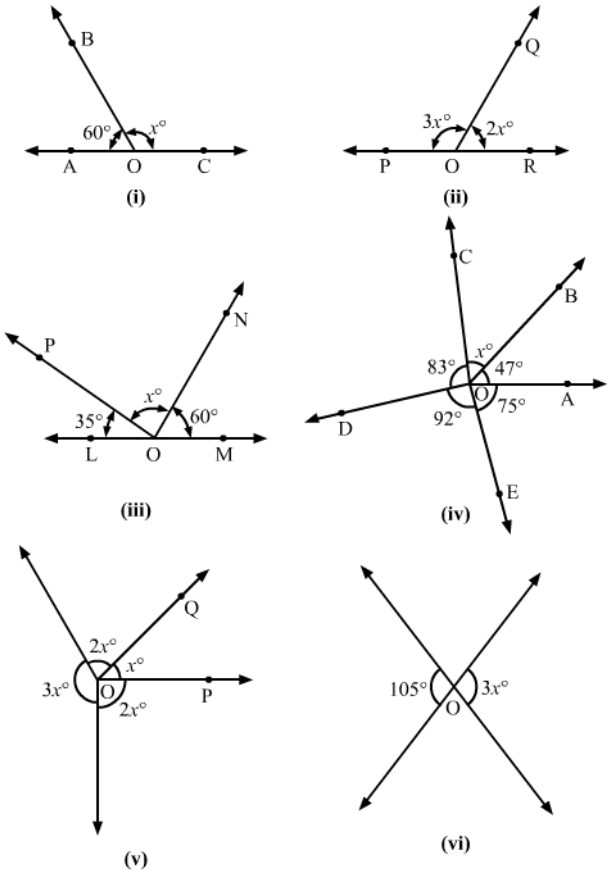
$x + 65° = 180°$

$\Rightarrow x = 180° - 65° = 115°$

The complement of angle *x* cannot be determined.

Question:20

Find the value of *x* in each of the following figures.



Solution:

i

Since $\angle BOA + \angle BOC = 180^\circ$ *Linearpair*

$\therefore \angle x = 180^\circ - \angle BOA = 180^\circ - 60^\circ = 120^\circ$

ii

Since $\angle QOP + \angle QOR = 180^\circ$ (Linear pair) $\therefore 2x + 3x = 180^\circ \Rightarrow 5x = 180^\circ \Rightarrow x = \frac{180^\circ}{5} = 36^\circ$

iii

Since $\angle LOP + \angle PON + \angle NOM = 180^\circ$ (Linear pair) $\therefore \angle PON = 180^\circ - \angle LOP - \angle NOM \Rightarrow x = 180^\circ - 35^\circ - 60^\circ \Rightarrow x = 180^\circ - 95^\circ = 85^\circ$

iv

Since $\angle COD + \angle DOE + \angle EOA + \angle AOB + \angle BOC = 360^\circ$ (Sum of all angles at a point) $\therefore 83^\circ + 92^\circ + 75^\circ + 47^\circ + x = 360^\circ \Rightarrow 297^\circ + x = 360^\circ$

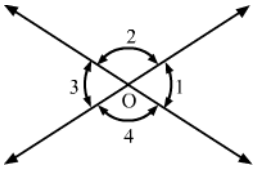
v

$2x^\circ + x^\circ + 2x^\circ + 3x^\circ = 180^\circ \Rightarrow 8x = 180 \Rightarrow x = \frac{180}{8} = 22.5^\circ$

vi
$3x^\circ = 105^\circ \Rightarrow x = \frac{105}{3} = 35^\circ$

Question:21

In Fig. 22, it being given that ∠1 = 65°, find all other angles.

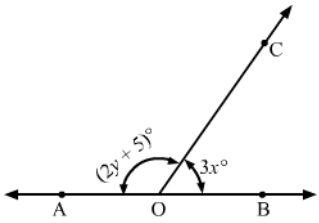


Solution:

$\angle 1 = \angle 3 \qquad Vertically opposite angles$
$\therefore \angle 3 = 65^\circ$
Since $\angle 1 + \angle 2 = 180^\circ \qquad Linear pair$
$\therefore \angle 2 = 180^\circ - 65^\circ = 115^\circ$
$\angle 2 = \angle 4 \qquad Vertically opposite angles$
$\therefore \angle 4 = \angle 2 = 115^\circ$ and $\angle 3 = 65^\circ$

Question:22

In Fig., *OA* and *OB* are opposite rays:



i If *x* = 25°, what is the value of *y*?

ii If *y* = 35°, what is the value of *x*?

Solution:

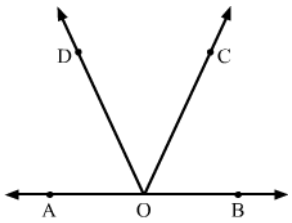
∠AOC + ∠BOC = 180° $\qquad Linear pair$
$\Rightarrow (2y + 5) + 3x = 180^\circ \Rightarrow 3x + 2y = 175^\circ$

i If *x* = 25°, then
$3 \times 25^\circ + 2y = 175^\circ \Rightarrow 75^\circ + 2y = 175^\circ \Rightarrow 2y = 175^\circ - 75^\circ = 100^\circ \Rightarrow y = \frac{100^\circ}{2} = 50^\circ$

ii If *y* = 35°, then
$3x + 2 \times 35^\circ = 175^\circ \Rightarrow 3x + 70^\circ = 175^\circ \Rightarrow 3x = 175^\circ - 70^\circ = 105^\circ \Rightarrow x = \frac{105^\circ}{3} = 35^\circ$

Question:23

In Fig., write all pairs of adjacent angles and all the linear pairs.



Solution:

Adjacent angles:

$\angle DOA$ and $\angle DOC \angle DOC$ and $\angle BOC$

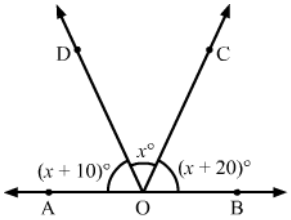
$\angle AOD$ and $\angle DOB \angle BOC$ and $\angle AOC$

Linear pairs of angles:

$\angle AOD$ and $\angle DOB \angle BOC$ and $\angle AOC$

Question:24

In Fig. 25, find ∠*x*. Further find ∠*BOC*, ∠*COD* and ∠*AOD*.



Solution:

$\angle AOD + \angle DOC + \angle COB = 180^\circ \left(Linear\ pair\right) \left(x+10\right)^\circ + x^\circ + \left(x+20\right)^\circ = 180^\circ 3x + 30^\circ = 180^\circ 3x = 180^\circ - 30^\circ 3x = 150^\circ x = \frac{150^\circ}{3} = 50^\circ$
$\angle BOC = x + 20^\circ = 50^\circ + 20^\circ = 70^\circ \angle COD = x = 50^\circ \angle AOD = x + 10^\circ = 50^\circ + 10^\circ = 60^\circ$

Question:25

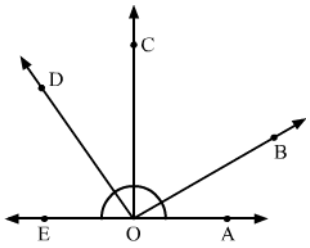
How many pairs of adjacent angles are formed when two lines intersect in a point?

Solution:

If two lines intersect at a point, then four adjacent pairs are formed, and those pairs are linear as well.

Question:26

How many pairs of adjacent angles, in all, can you name in Fig.?

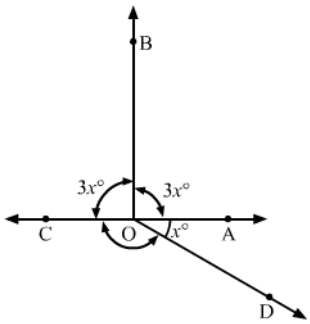


Solution:

There are 10 adjacent pairs in the given figure; they are:
$\angle \mathrm{EOD}\ \text{and}\ \angle \mathrm{DOC} \angle \mathrm{COD}\ \text{and}\ \angle \mathrm{BOC} \angle \mathrm{COB}\ \text{and}\ \angle \mathrm{BOA}$
$\angle \mathrm{AOB}\ \text{and}\ \angle \mathrm{BOD} \angle \mathrm{BOC}\ \text{and}\ \angle \mathrm{COE} \angle \mathrm{COD}\ \text{and}\ \angle \mathrm{COA} \angle \mathrm{DOE}\ \text{and}\ \angle \mathrm{DOB}$
$\angle \mathrm{EOD}\ \text{and}\ \angle \mathrm{DOA} \angle \mathrm{EOC}\ \text{and}\ \angle \mathrm{AOC} \angle \mathrm{AOB}\ \text{and}\ \angle \mathrm{BOE}$

Question:27

In Fig., determine the value of *x*.

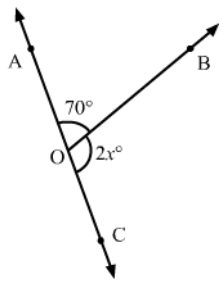


Solution:

$\angle \mathrm{AOB} + \angle \mathrm{BOC} = 180^\circ \quad (\text{Linear pair}) \Rightarrow 3x + 3x = 180^\circ \Rightarrow 6x = 180^\circ \Rightarrow x = \frac{180^\circ}{6} = 30^\circ$

Question:28

In Fig., *AOC* is a line, find *x*.

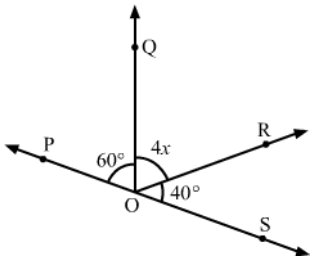


Solution:

$\angle \mathrm{AOB} + \angle \mathrm{BOC} = 180^\circ \quad (\text{Linear pair}) \Rightarrow 70^\circ + 2x = 180^\circ \Rightarrow 2x = 180^\circ - 70^\circ = 110^\circ \Rightarrow x = \frac{110^\circ}{2} = 55^\circ$

Question:29

In Fig., *POS* is a line, find *x*.



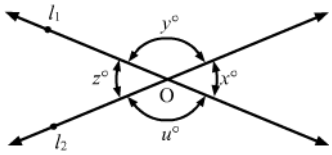
Solution:

$\angle \mathrm{QOP} + \angle \mathrm{QOR} + \angle \mathrm{ROS} = 180^\circ \quad Anglesonastraightline$

$\Rightarrow 60^\circ + 4x + 40^\circ = 180^\circ \Rightarrow 100^\circ + 4x = 180^\circ \Rightarrow 4x = 180^\circ - 100^\circ = 80^\circ \Rightarrow x = \frac{80^\circ}{4} = 20^\circ$

Question:30

In Fig., lines l_1 and l_2 intersect at *O*, forming angles as shown in the figure. If $x = 45°$, find the values of *y*, *z* and *u*.

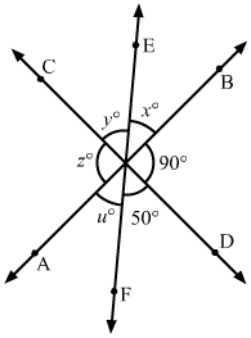


Solution:

$\angle z = \angle x = 45^\circ \quad (\text{Vertically opposite angles}) \text{Now}, \angle x + \angle y = 180^\circ \quad (\text{Linear pair}) \Rightarrow \angle y = 180^\circ - 45^\circ = 135^\circ \angle u = \angle y = 135^\circ \quad (\text{Vertically opp}$

Question:31

In Fig., three coplanar lines intersect at a point *O*, forming angles as shown in the figure. Find the values of *x*, *y*, *z* and *u*.



Solution:

$\angle \mathrm{BOD} + \angle \mathrm{DOF} + \angle \mathrm{FOA} = 180° \quad Linearpair$

$\therefore \angle \mathrm{FOA} = \angle u = 180^\circ - 90^\circ - 50^\circ = 40^\circ$

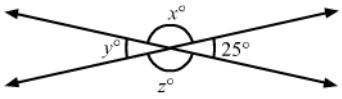
$\angle \mathrm{FOA} = \angle x = 40^\circ \quad Verticallyoppositeangles$

$\angle \mathrm{BOD} = \angle z = 90^\circ \quad Verticallyoppositeangles$

$\angle \mathrm{EOC} = \angle y = 50^\circ \quad Verticallyoppositeangles$

Question:32

In Fig., find the values of *x*, *y* and *z*.

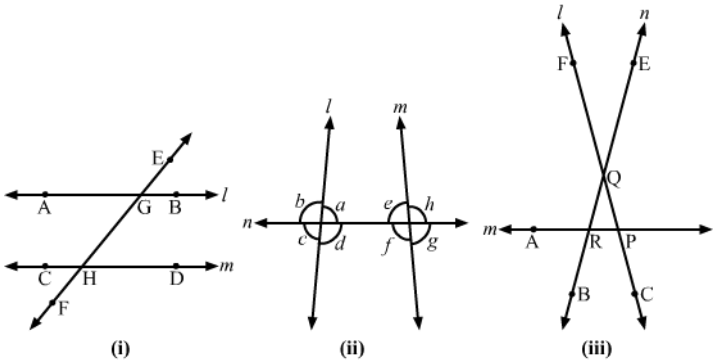


Solution:

$\angle y = 25^\circ \quad (\text{Vertically opposite angles}) \text{Since } \angle x + \angle y = 180^\circ \quad (\text{Linear pair}) \therefore \angle x = 180^\circ - 25^\circ = 155^\circ \angle z = \angle x = 155^\circ \quad (\text{Vertically opposit}$

Question:33

In Fig., line *n* is a transversal to lines *l* and *m*. Identify the following:



i Alternate and corresponding angles in Fig. i.

ii Angles alternate to $\angle d$ and $\angle g$ and angles corresponding to angles $\angle f$ and $\angle h$ in Fig. ii.

iii Angle alternate to $\angle PQR$, angle corresponding to $\angle RQF$ and angle alternate to $\angle PQE$ in Fig. iii.

iv Pairs of interior and exterior angles on the same side of the transversal in Fig. ii.

Solution:

i **Figure** i

Corresponding angles:

∠EGB and ∠GHD

∠HGB and ∠FHD

∠EGA and ∠GHC

∠AGH and ∠CHF

Alternate angles:

∠EGB and ∠CHF

∠HGB and ∠CHG

∠EGA and ∠FHD

∠AGH and ∠GHD

ii **Figure** ii

Alternate angle to $\angle d$ is $\angle e$.

Alternate angle to $\angle g$ is $\angle b$.

Also,

Corresponding angle to $\angle f$ is $\angle c$.

Corresponding angle to $\angle h$ is $\angle a$.

iii **Figure** iii

Angle alternate to ∠PQR is ∠QRA.

Angle corresponding to ∠RQF is ∠ARB.

Angle alternate to ∠POE is ∠ARB.

iv **Figure** ii

Pair of interior angles are

$\angle a$ and $\angle e$

$\angle d$ and $\angle f$

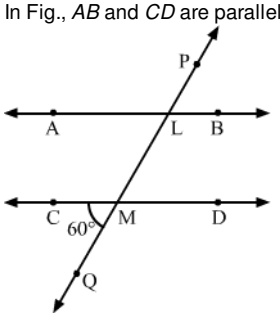
Pair of exterior angles are

$\angle b$ and $\angle h$

$\angle c$ and $\angle g$

Question:34

In Fig., *AB* and *CD* are parallel lines intersected by a transversal *PQ* at *L* and *M* respectively. If $\angle CMQ = 60°$, find all other angles in the figure.



Solution:

$\angle ALM = \angle CMQ = 60^\circ$ $Corresponding angles$

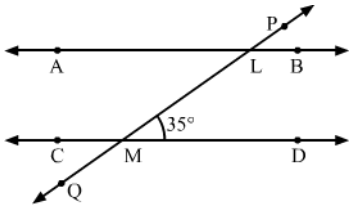
$\angle LMD = \angle CMQ = 60^\circ$ $Vertically opposite angles$

$\angle ALM = \angle PLB = 60^\circ$ $Vertically opposite angles$

Since
$\angle CMQ + \angle QMD = 180^\circ \quad Linear pair$
$\therefore \angle QMD = 180^\circ - 60^\circ = 120^\circ$
$\angle QMD = \angle MLB = 120^\circ \quad Corresponding angles$
$\angle QMD = \angle CML = 120^\circ \quad Vertically opposite angles$
$\angle MLB = \angle ALP = 120^\circ \quad Vertically opposite angles$

Question:35

In Fig., *AB* and *CD* are parallel lines intersected by a transversal *PQ* at *L* and *M* respectively. If $\angle LMD = 35°$ find $\angle ALM$ and $\angle PLA$.

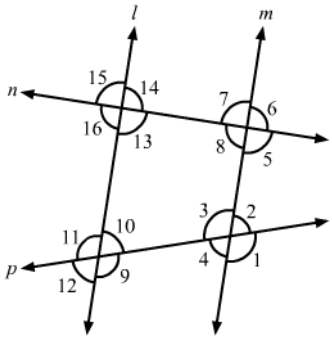


Solution:

In the given Fig., AB || CD.
$\angle ALM = \angle LMD = 35^\circ \quad (\text{Alternate interior angles})\, \text{Since } \angle PLA + \angle ALM = 180^\circ \quad (\text{Linear pair}) \therefore \angle PLA = 180^\circ - 35^\circ = 145^\circ$

Question:36

The line *n* is transversal to line *l* and *m* in Fig. Identify the angle alternate to $\angle 13$, angle corresponding to $\angle 15$, and angle alternate to $\angle 15$.

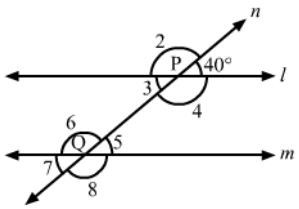


Solution:

In this given Fig., line *l* || *m*.
Here,
Alternate angle to $\angle 13$ is $\angle 7$.
Corresponding angle to $\angle 15$ is $\angle 7$.
Alternate angle to $\angle 15$ is $\angle 5$.

Question:37

In Fig., line *l* || *m* and *n* is a transversal. If $\angle 1 = 40°$, find all the angles and check that all corresponding angles and alternate angles are equal.

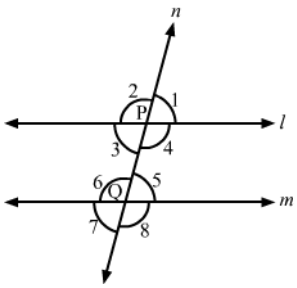


Solution:

In the given figure, *l* || *m*.
Here,
$\angle 1 + \angle 2 = 180^\circ \quad (\text{Linear pair}) \therefore \angle 2 = 180^\circ - \angle 1 = 180^\circ - 40^\circ = 140^\circ \angle 5 = \angle 1 = 40^\circ \quad (\text{Corresponding angles}) \angle 3 = \angle 1 = 40^\circ \quad (\text{Vertically op}$
Also,
$\angle 2 = \angle 6 = 140^\circ \quad (\text{Corresponding angles}) \angle 2 = \angle 4 = 140^\circ \quad (\text{Vertically opposite angles}) \angle 4 = \angle 8 = 140^\circ \quad (\text{Corresponding angles}) \angle 8 = \angle 6 =$
Thus,
$\angle 2 = \angle 8,\ \angle 3 = \angle 5,\ \angle 6 = \angle 4,\ \angle 1 = \angle 7$
Hence, alternate angles are equal.

Question:38

In Fig., line *l* || *m* and a transversal *n* cuts them at *P* and *Q* respectively. If $\angle 1 = 75°$, find all other angles.



Solution:

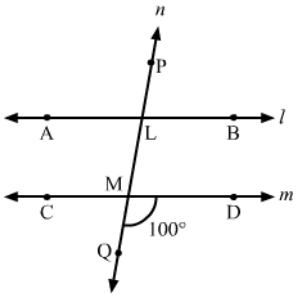
In the given figure, *l* || *m*, *n* is a transversal line and ∠1 = 75°.

Thus, we have:

$\angle 1 + \angle 2 = 180^\circ \quad (\text{Linear pair}) \Rightarrow \angle 2 = 180^\circ - \angle 1 = 180^\circ - 75^\circ = 105^\circ \therefore \angle 1 = \angle 5 = 75^\circ \quad (\text{Corresponding angles}) \angle 1 = \angle 3 = 75^\circ \quad (\text{Vertic}$

Question:39

In Fig., *AB* || *CD* and a transversal *PQ* cuts them at *L* and *M* respectively. If ∠*QMD* = 100°, find all other angles.



Solution:

In the given figure, AB || CD, PQ is a transversal line and ∠QMD = 100°.

Thus, we have:

∠DMQ + ∠QMC = 180° $Linear pair$

$\therefore \angle \text{QMC} = 180^\circ - \angle \text{DMQ} = 180^\circ - 100^\circ = 80^\circ$

Thus,

∠DMQ = ∠BLM = 100° $Corresponding angles$

∠DMQ = ∠CML = 100° $Vertically opposite angles$

∠BLM = ∠PLA = 100° $Vertically opposite angles$

Also,

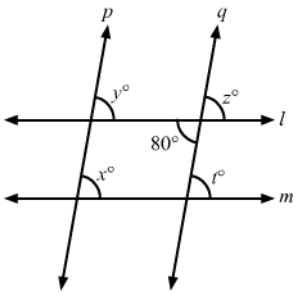
∠CMQ = ∠ALM = 80° $Corresponding angles$

∠CMQ = ∠DML = 80° $Vertically opposite angles$

∠ALM = ∠PLB = 80° $Vertically opposite angles$

Question:40

In Fig., *l* || *m* and *p* || *q*. Find the values of *x*, *y*, *z*, *t*.



Solution:

In the given figure, *l* || *m* and *p* || *q*.

Thus, we have:

$\angle z = 80^\circ \quad Vertically opposite angles$

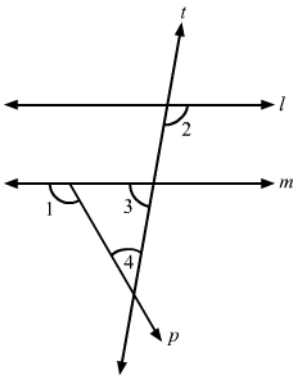
$\angle z = \angle t = 80^\circ \quad Corresponding angles$

$\angle z = \angle y = 80^\circ \quad Corresponding angles$

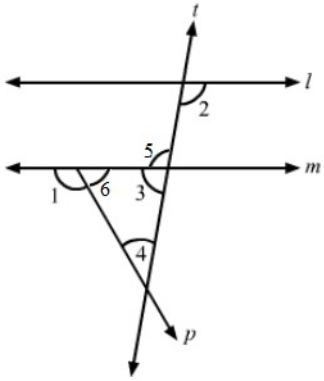
$\angle x = \angle y = 80^\circ \quad Corresponding angles$

Question:41

In Fig., line *l* || *m*, ∠1 = 120° and ∠2 = 100°, find out ∠3 and ∠4.



Solution:



In the given figure, ∠1 = 120° and ∠2 =100°.

Since *l* || *m*, so

$\angle 2 = \angle 5 = 100^\circ$ $(\text{Alternate interior angles}) \angle 5 + \angle 3 = 180^\circ$ $(\text{Linear pair}) \Rightarrow \angle 3 = 180^\circ - \angle 5 = 180^\circ - 100^\circ = 80^\circ$

Also,

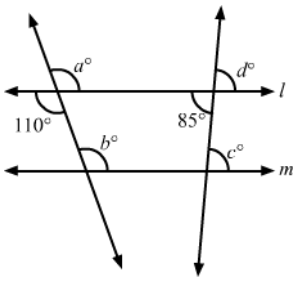
$\angle 1 + \angle 6 = 180^\circ$ $(\text{Linear pair}) \Rightarrow \angle 6 = 180^\circ - \angle 1 = 180^\circ - 120^\circ = 60^\circ$

We know that the sum of all the angles of triangle is 180°.

$\therefore \angle 6 + \angle 3 + \angle 4 = 180^\circ \Rightarrow 60^\circ + 80^\circ + \angle 4 = 180^\circ \Rightarrow 140^\circ + \angle 4 = 180^\circ \Rightarrow \angle 4 = 180^\circ - 140^\circ = 40^\circ$

Question:42

In Fig., line *l* || *m*. Find the values of *a*, *b*, *c*, *d*. Give reasons.



Solution:

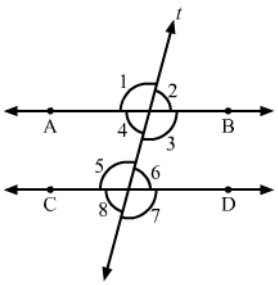
In the given figure, line *l* || *m*.

Thus, we have:

$\angle a = 110^\circ$ $(\text{Vertically opposite angles}) \angle b = \angle a = 110^\circ$ $(\text{Corresponding angles}) \angle d = 85^\circ$ $(\text{Vertically opposite angles}) \angle c = \angle d = 85^\circ$

Question:43

In Fig., *AB* || *CD* and ∠1 and ∠2 are in the ratio 3 : 2. Determine all angles from 1 to 8.



Solution:

In the given figure, *AB* || *CD* and *t* is a transversal line.

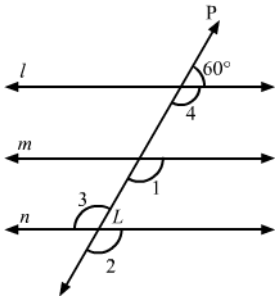
Now, let:
$\angle 1 = 3x \angle 2 = 2x$

Thus, we have:
$\angle 1 + \angle 2 = 180^\circ \quad (\text{Linear pair}) \therefore 3x + 2x = 180^\circ \Rightarrow 5x = 180^\circ \Rightarrow x = \frac{180^\circ}{5} = 36^\circ \text{ Thus}, \angle 1 = 3 \times 36^\circ = 108^\circ \angle 2 = 2 \times 36^\circ = 72^\circ$

Now,
$\angle 1 = \angle 5 = 108^\circ \quad (\text{Corresponding angles}) \angle 1 = \angle 3 = 108^\circ \quad (\text{Vertically opposite angles}) \angle 5 = \angle 7 = 108^\circ \quad (\text{Vertically opposite angles}) \angle 2 = \angle 6 =$

Question:44

In Fig., *l*, *m* and *n* are parallel lines intersected by transversal *p* at *X*, *Y* and *Z* respectively. Find ∠1, ∠2 and ∠3.



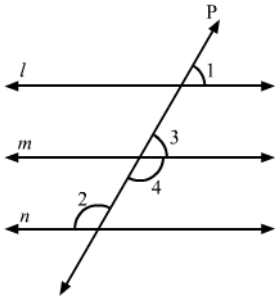
Solution:

In the given figure, *l* // *m* || *n* and *p* is a transversal line.

Thus, we have:
$\angle 4 + 60^\circ = 180^\circ \quad (\text{Linear pair}) \Rightarrow \angle 4 = 180^\circ - 60^\circ = 120^\circ \angle 4 = \angle 1 = 120^\circ \quad (\text{Corresponding angles}) \angle 1 = \angle 2 = 120^\circ \quad (\text{Corresponding angles})$

Question:45

In Fig., if *l* || *m* || *n* and ∠1 = 60°, find ∠2.



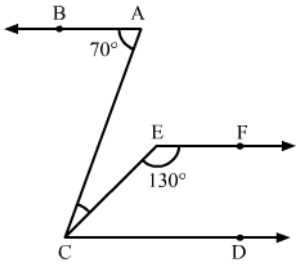
Solution:

In the given figure, *l* || *m* || *n* and ∠1 = 60°.

Thus, we have:
$\angle 3 = \angle 1 = 60^\circ \quad (\text{Corresponding angle}) \text{Now}, \angle 3 + \angle 4 = 180^\circ \quad (\text{Linear pair}) \angle 4 = 180^\circ - \angle 3 = 180^\circ - 60^\circ = 120^\circ \angle 2 = \angle 4 = 120^\circ \quad (\text{Alternate int}$

Question:46

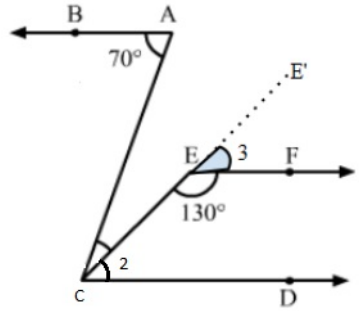
In Fig., if *AB* || *CD* and *CD* || *EF*, find ∠*ACE*.



Solution:

In the given figure, *AB* || *CD* and *CD* || *EF*.

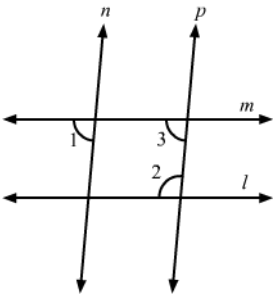
Extend line *CE* to *E*′.



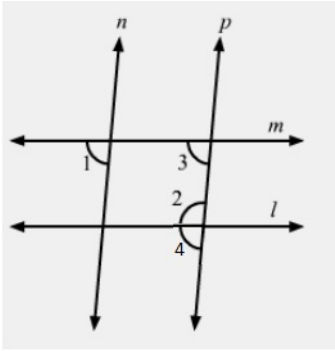
Thus, we have:
$\angle BAC = \angle ACD = 70^\circ \quad (\text{Alternate angles})$ Now, $\angle 3 + \angle CEF = 180^\circ \quad (\text{Linear pair}) \Rightarrow \angle 3 = 180^\circ - \angle CEF = 180^\circ - 130^\circ = 50^\circ$ Since C

Question:47

In Fig., if *l* || *m*, *n* || *p* and ∠1 = 85°, find ∠2.



Solution:



In the given figure, *l* || *m*, *n* || *p* and ∠1 = 85°.

Now, let ∠4 be the adjacent angle of ∠2.

Thus, we have:

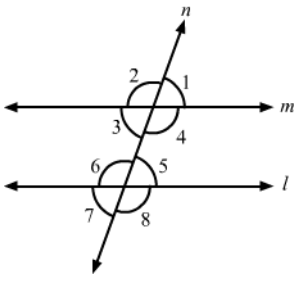
$\angle 3 = \angle 1 = 85^\circ \quad (\text{Corresponding angles})$

$\angle 3 + \angle 2 = 180^\circ \quad Sum of interior angles on the same side of the transversal$

$\therefore \angle 2 = 180^\circ - \angle 3 = 180^\circ - 85^\circ = 95^\circ$

Question:48

In Fig., a transversal *n* cuts two lines *l* and *m*. If ∠1 = 70° and ∠7 = 80°, is *l* || *m*?



Solution:

We know that if the alternate exterior angles of two lines are equal, then the lines are parallel.

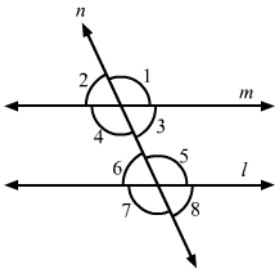
In the given figure, $\angle 1$ and $\angle 7$ are alternate exterior angles, but they are not equal.

$\angle 1 \neq \angle 770^\circ \neq 80^\circ$

Therefore, lines *l* and *m* are not parallel.

Question:49

In Fig., a transversal *n* cuts two lines *l* and *m* such that ∠2 = 65° and ∠8 = 65°. Are the lines parallel?



Solution:

∠2 = ∠3 = 65° $Vertically opposite angles$

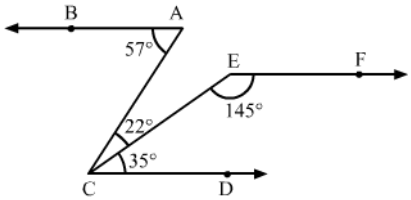
∠8 = ∠6 = 65° $Vertically opposite angles$

∴ ∠3 = ∠6

⇒ *l* || *m* $Two lines are parallel if the alternate angles formed with the transversal are equal$

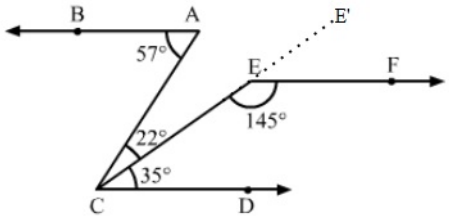
Question:50

In Fig., show that AB || EF.



Solution:

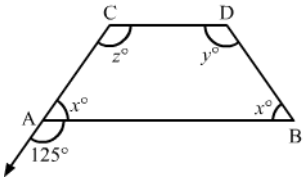
Extend line CE to E'.



$\angle BAC = 57^\circ = 22^\circ + 35^\circ = \angle ACE + \angle ECD \therefore AB || CD$ Here, $\angle E'EF + \angle FEC = 180^\circ$ (Linear pair) $\Rightarrow \angle E'EF = 180^\circ - \angle FEC = 180^\circ - 145^\circ = 35^\circ$

Question:51

In Fig., AB || CD. Find the values of *x*, *y*, *z*.



Solution:

$\angle x + 125^\circ = 180^\circ$ $Linear pair$

$\therefore \angle x = 180^\circ - 125^\circ = 55^\circ$

$\angle z = 125^\circ$ $Corresponding angles$

$\angle x + \angle z = 180^\circ$ (Sum of adjacent interior angles is 180°)

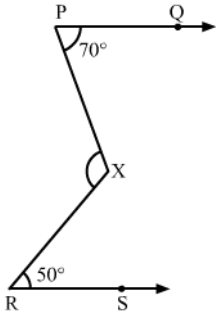
$\angle x + 125^\circ = 180^\circ \Rightarrow \angle x = 180^\circ - 125^\circ = 55^\circ$

$\angle x + \angle y = 180^\circ$ (Sum of adjacent interior angles is 180°)

$55^\circ + \angle y = 180^\circ \Rightarrow \angle y = 180^\circ - 55^\circ = 125^\circ$

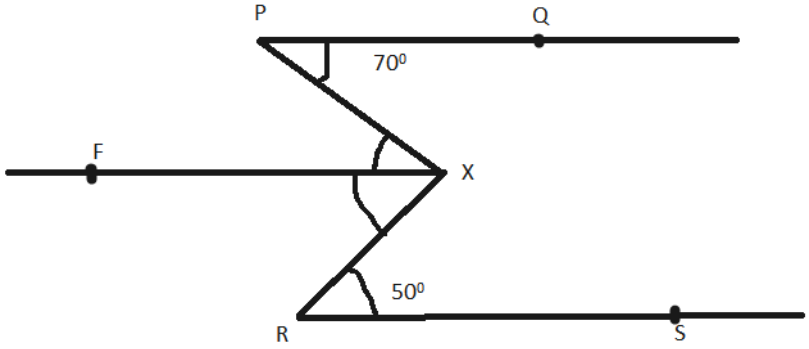
Question:52

In Fig., find out ∠*PXR*, if PQ || RS.



Solution:

Draw a line parallel to *PQ* passing through *X*.



Here,

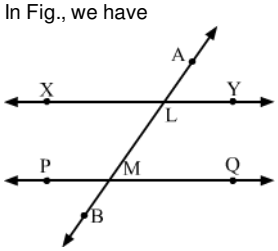
$\angle PQX = \angle PXF = 70^\circ$ and $\angle SRX = \angle RXF = 50^\circ$ $Alternate interior angles$

$\because$ PQ || RS || XF

$\therefore \angle PXR = \angle PXF + \angle FXR = 70^\circ + 50^\circ = 120^\circ$

Question:53

In Fig., we have



i ∠MLY = 2 ∠LMQ, find ∠LMQ.

ii ∠XLM = (2*x* – 10)° and ∠LMQ = *x* + 30°, find *x*.

iii ∠XLM = ∠PML, find ∠ALY

iv ∠ALY = (2*x* – 15)°, and ∠LMQ = (*x* + 40)°, find *x*

Solution:

i

$\angle LMQ = \angle ALY$ (Corresponding angles) $\therefore \angle MLY + \angle ALY = 180^\circ$ (Linear pair) $\Rightarrow 2\angle ALY + \angle ALY = 180^\circ \Rightarrow 3\angle ALY = 180^\circ \Rightarrow \angle AL$

ii

$\angle XLM = \angle LMQ$ (Alternate interior angles) $\Rightarrow (2x - 10)^\circ = (x + 30)^\circ \Rightarrow 2x - x = 30^\circ + 10^\circ \Rightarrow x = 40^\circ$

iii

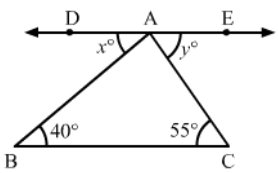
$\angle ALX = \angle LMP$ (Corresponding angles) $\angle ALX + \angle XLM = 180^\circ$ (Linear pair) $\angle XLM = \angle LMP$ (Given) $\therefore \angle LMP + \angle LMP = 180^\circ \Rightarrow 2\angle L$

iv

$\angle ALY = \angle LMQ$ (Corresponding angles) $\therefore (2x - 15)^\circ = (x + 40)^\circ \Rightarrow 2x - x = 40^\circ + 15^\circ \Rightarrow x = 55^\circ$

Question:54

In Fig., *DE* || *BC*. Find the values of *x* and *y*.



Solution:

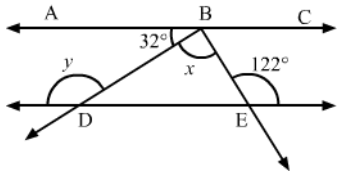
∠ABC = ∠DAB $Alternate interior angles$

$\therefore x = 40^\circ$

$\angle ACB = \angle EAC$ $Alternate interior angles$
$\therefore y = 55^\circ$

Question:55

In Fig., line AC || line DE and ∠ABD = 32°. Find out the angles *x* and *y* if ∠E = 122°.



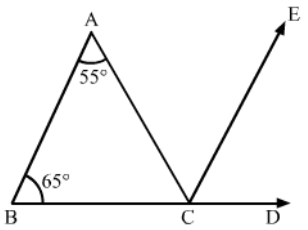
Solution:

$\angle BDE = \angle ABD = 32^\circ$ $(\text{Alternate interior angles}) \Rightarrow \angle BDE + y = 180^\circ$ $(\text{Linear pair}) \Rightarrow 32^\circ + y = 180^\circ \Rightarrow y = 180^\circ - 32^\circ = 148^\circ$

$\angle ABE = \angle E = 122^\circ$ $(\text{Alternate interior angle}) \angle ABD + \angle DBE = 122^\circ 32^\circ + x = 122^\circ x = 122^\circ - 32^\circ = 90^\circ$

Question:56

In Fig., side BC of ΔABC has been produced to D and CE || BA. If ∠ABC = 65°, ∠BAC = 55°, find ∠ACE, ∠ECD and ∠ACD.

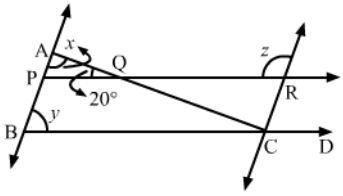


Solution:

∠ABC = ∠ECD = 55° $Corresponding angles$
∠BAC = ∠ACE = 65° $Alternate interior angles$
Now, ∠ACD = ∠ACE + ∠ECD
⇒ ∠ACD = 55° + 65° = 120°

Question:57

In Fig., line *CA* ⊥ *AB* || line *CR* and line *PR* || line *BD*. Find ∠*x*, ∠*y* and ∠*z*.

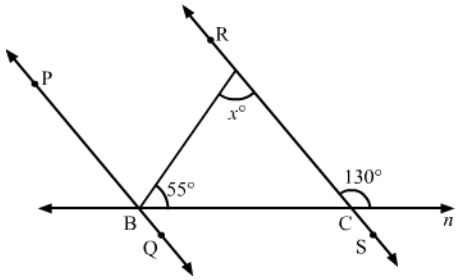


Solution:

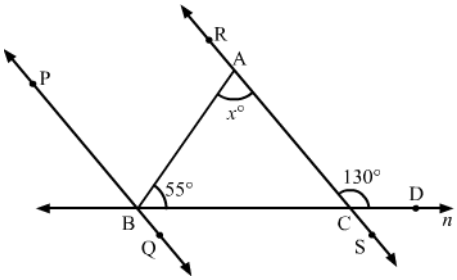
Since CA ⊥ AB,
$\therefore \angle x = 90^\circ$
We know that the sum of all the angles of triangle is 180°.
$\text{In } \Delta APQ, \angle QAP + \angle APQ + \angle PQA = 180^\circ \Rightarrow 90^\circ + \angle APQ + 20^\circ = 180^\circ \Rightarrow 110^\circ + \angle APQ = 180^\circ \Rightarrow \angle APQ = 180^\circ - 110^\circ = 70^\circ$
$\angle PBC = \angle APQ = 70^\circ$ $Corresponding angles$
Since $\angle PRC + \angle z = 180^\circ$ (Linear pair)
$\therefore \angle z = 180^\circ - 70^\circ = 110^\circ$ $[\angle APQ = \angle PRC \quad (\text{Alternate interior angles})]$

Question:58

In Fig., *PQ* || *RS*. Find the value of *x*.



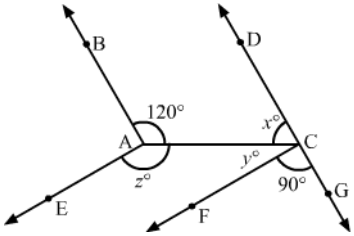
Solution:



$\angle \mathrm{RCD}+\angle \mathrm{RCB}=180^{\circ}$ (Linear pair) $\Rightarrow \angle \mathrm{RCB}=180^{\circ}-130^{\circ}=50^{\circ}$ In $\triangle \mathrm{ABC}$, $\angle \mathrm{BAC}+\angle \mathrm{ABC}+\angle \mathrm{BCA}=180^{\circ}$ (Angle sum property) $\Rightarrow \angle \mathrm{BAC}$

Question:59

In Fig., AB || CD and AE || CF; ∠FCG = 90° and ∠BAC = 120°. Find the values of *x*, *y* and *z*.



Solution:

∠BAC = ∠ACG = 120° *Alternateinteriorangle*

∴ ∠ACF + ∠FCG = 120°

⇒ ∠ACF = 120° – 90° = 30°

∠DCA + ACG = 180° Linear pair

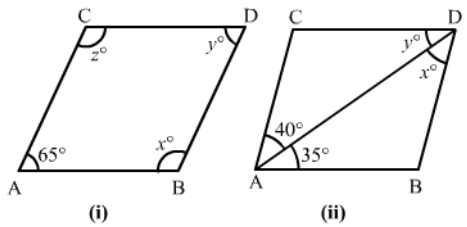
⇒*x* = 180° – 120° = 60°

BAC + BAE + EAC = 360°

CAE = 360° – 120° – 60° + 30° = 150° (BAE = DCF)

Question:60

In Fig., AB || CD and AC || BD. Find the values of *x*, *y*, *z*.



Solution:

i Since AC || BD and CD || AB, ABCD is a parallelogram.

CAB + ACD = 180° Sum of adjacent angles of a parallelogram

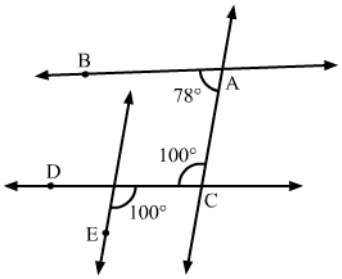
∴ ACD = 180° – 65° = 115°

CAD = CDB = 65° Opposite angles of a parallelogram

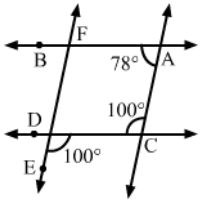
ACD = DBA = 115° Opposite angles of a parallelogram

ii Here,
AC || BD and CD || AB
DAC = x = 40° Alternate interior angle
DAB = y = 35° Alternate interior angle

Question:61
In Fig., state which lines are parallel and why?

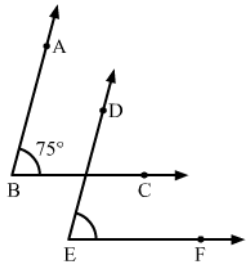


Solution:
Let F be the point of intersection of line CD and the line passing through point E.

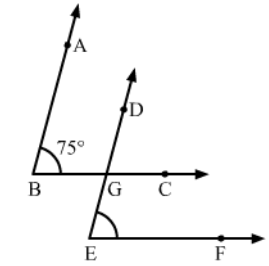


Since ACD and CDE are alternate and equal angles, so
ACD = 100° = CDE
∴ AC || EF

Question:62
In Fig. 87, the corresponding arms of ∠ABC and ∠DEF are parallel. If ∠ABC = 75°, find ∠DEF.



Solution:



Construction: Let G be the point of intersection of lines BC and DE.

∵ AB || DE and BC || EF

∴ Corresponding angles

Question:63

The sum of an angle and one third of its supplementary angle is 90°. The measure of the angle is

a 135°

b 120°

c 60°

d 45°

Solution:

Let the required angle be x.

Now, supplementary of the required angle = $180^\circ - x$

Then,

Hence, the correct answer is option d.

Question:64

If angles of a linear pair are equal, then the measure of each angle is

a 30°

b 45°

c 60°

d 90°

Solution:

Let the required angle be x

Now, Sum of linear pair angles = 180°

$\Rightarrow x + x = 180^\circ$

$\Rightarrow 2x = 180^\circ$

$\Rightarrow x = 90^\circ$

Hence, the correct answer is option d.

Question:65

Two complemntary angles are in the ratio 2 : 3. The measure of the larger angle is

a 60°

b 54°

c 66°

d 48°

Solution:

Let the angles be $2x$ and $3x$.

Now, $2x + 3x = 90^\circ$

$\Rightarrow 5x = 90^\circ$

$\Rightarrow x = 18^\circ$

$\therefore$ Larger angle = $3x = 3 \times 18^\circ = 54^\circ$

Hence, the correct answer is option b.

Question:66

An angle is thrice its supplement. The measure of the angle is

a 120°

b 105°

c 135°

d 150°

Solution:

Let the required angle be x.

Then,

Hence, the correct answer is option c.

Question:67

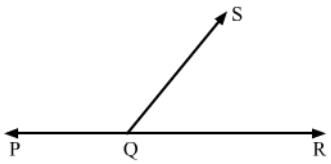
In Fig. 88 PR is a straight line and $\angle PQS : \angle SQR = 7 : 5$. The measure of $\angle SQR$ is

a 60°

b

c

d 75°



Solution:

Let the measures of the angle ∠PQS and ∠SQR be $7x$ and $5x$.

Now, ∠PQS + ∠SQR = 180° Linear pair angles

$\Rightarrow 7x + 5x = 180°$

$\Rightarrow 12x = 180°$

$\Rightarrow x = 15°$

$\therefore \angle SQR = 5x = 5 \times 15° = 75°$

Hence, the correct answer is option d.

Question:68

The sum of an angle and half of its complementary angle is 75°. The measure of the angle is

a 40°

b 50°

c 60°

d 80°

Solution:

Let the required angle be x.

Now, complementnary of the required angle = $90° - x$

Then,

Hence, the correct answer is option c.

Question:69

∠A is an obtuse angle. The measure of ∠A and twice its supplementary differ by 30°. Then ∠A can be

a 150°

b 110°

c 140°

d 120°

Solution:

Supplementary of ∠A = 180° − ∠A

Now,

$\angle A + 30° = 2(180° - \angle A)$

$\Rightarrow \angle A + 30° = 360° - 2\angle A$

$\Rightarrow 3\angle A = 360° - 30°$

$\Rightarrow 3\angle A = 330°$

$\Rightarrow \angle A = 110°$

Hence, the correct answer is option b.

Question:70

An angle is double of its supplement. The measure of the angle is

a 60°

b 120°

c 40°

d 80°

Solution:

Let the required angle be x.

Now, supplementary of the required angle = $180° - x$

Then,

Hence, the correct answer is option b.

Question:71

The measure of an angle which is its own complement is

a 30°

b 60°

c 90°

d 45°

Solution:

Let the required angle be x.

Now, complementary of the required angle = $90° - x$

Then,

Hence, the correct answer is option d.

Question:72

Two supplementary angles are in the ratio 3 : 2. The smaller angle measures

a 108°

b 81°

c 72°

d 68°

Solution:

Let the angles be $3x$ and $2x$.

Now, $3x + 2x = 180°$

$\Rightarrow 5x = 180°$

$\Rightarrow x = 36°$

$\therefore$ Smaller angle = $2x = 2 \times 36° = 72°$

Hence, the correct answer is option c.

Question:73

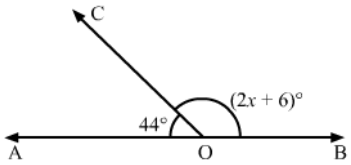
In Fig. 89, the value of x is

a 75

b 65

c 45

d 55



Solution:

$\angle AOC$ and $\angle BOC = 180°$ $\because$ Linear pair angles

$\Rightarrow 44° + (2x + 6)° = 180°$

$\Rightarrow (2x + 6)° = 136°$

$\Rightarrow 2x + 6 = 136$

$\Rightarrow 2x = 130$

$\Rightarrow x = 65$

Hence, the correct answer is option b.

Question:74

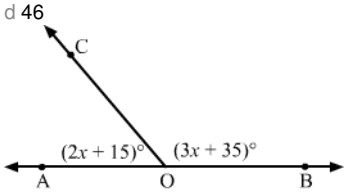
In Fig. 90, AOB is a straight line and the ray OCstands on it. The value of x is

a 16

b 26

c 36

d 46



Solution:

$\angle AOC + \angle BOC = 180°$ $\because$ Linear pair angles

$\Rightarrow (2x + 15)° + (3x + 35)° = 180°$

$\Rightarrow (5x + 50)° = 180°$

$\Rightarrow 5x + 50 = 180$

$\Rightarrow 5x = 130$

$\Rightarrow x = 26$

Hence, the correct answer is option b.

Question:75

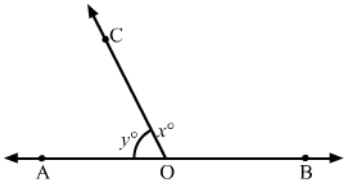
In Fig. 91, AOB is a straight line and $4x = 5y$. The value of x is

a 100

b 105

c 110

d 115



Solution:

$\angle AOC + \angle BOC = 180^\circ$ ∵ Linear pair angles

$\Rightarrow y^\circ + x^\circ = 180^\circ$

$\Rightarrow y + x = 180$

Hence, the correct answer is option a.

Question:76

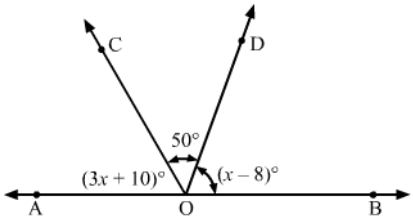
In Fig. 92, AOB is a straight line such that $\angle AOC = (3x + 10)^\circ$, $\angle COD = 50^\circ$ and $\angle BOD = (x - 8)^\circ$. The value of x is

a 32

b 36

c 42

d 52



Solution:

$\angle AOC + \angle COD + \angle BOD = 180^\circ$ AOB is a straight line

$\Rightarrow (3x + 10)^\circ + 50^\circ + (x - 8)^\circ = 180^\circ$

$\Rightarrow 3x + 10 + 50 + x - 8 = 180$

$\Rightarrow 4x + 52 = 180$

$\Rightarrow 4x = 128$

$\Rightarrow x = 32$

Hence, the correct answer is option a.

Question:77

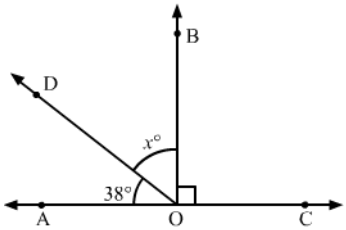
In Fig. 93, if AOC is a straight line, then x =

a 42°

b 52°

c 142°

d 38°



Solution:

$\angle AOD + \angle DOB + \angle BOC = 180^\circ$ ∵ AOC is a straight line

$\Rightarrow 38^\circ + x + 90^\circ = 180^\circ$

$\Rightarrow x + 128^\circ = 180^\circ$

$\Rightarrow x = 52^\circ$

Hence, the correct answer is option b.

Question:78

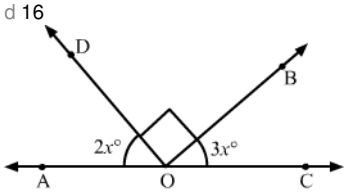
In Fig. 94, if ∠AOC is a straight line, then the value of x is

a 15

b 18

c 20

d 16



Solution:

$\angle AOD + \angle DOB + \angle BOC = 180°$ AOC is a straight line

$\Rightarrow 2x° + 90° + 3x° = 180°$

$\Rightarrow 5x° + 90° = 180°$

$\Rightarrow 5x = 90$

$\Rightarrow x = 18$

Hence, the correct answer is option b.

Question:79

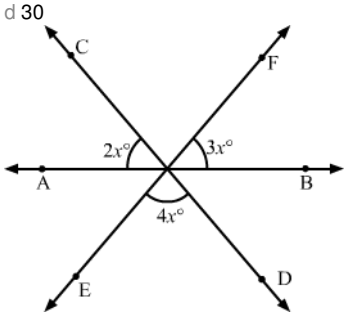
In Fig. 95, if AB, CD and EF are straight lines, then x =

a 5

b 10

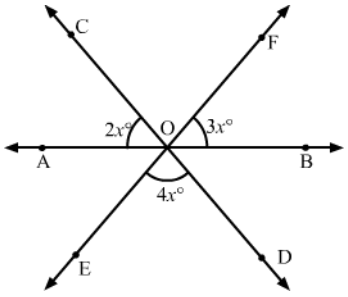
c 20

d 30



Solution:

Let all the lines intersect at O.



$\angle COF = \angle DOE = 4x°$ Vertically opposite angles

$\angle AOC + \angle COF + \angle BOF = 180°$ AOB is a straight line

$\Rightarrow 2x° + 4x° + 3x° = 180°$

$\Rightarrow 9x° = 180°$

$\Rightarrow 9x = 180$

$\Rightarrow x = 20$

Hence, the correct answer is option c.

Question:80

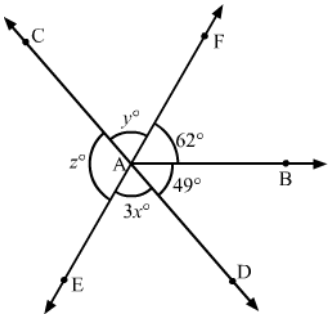
In Fig. 96, if AB, CD and EF are straight lines, then $x + y + z$ =

a 180

b 203

c 213

d 134



Solution:

$\angle DAE + \angle BAD + \angle BAF = 180^\circ$ EAF is a straight line

$\Rightarrow 3x^\circ + 49^\circ + 62^\circ = 180^\circ$

$\Rightarrow 3x^\circ + 111^\circ = 180^\circ$

$\Rightarrow 3x^\circ = 69^\circ$

$\Rightarrow 3x = 69$

$\Rightarrow x = 23$

Now, $\angle CAE + \angle CAF = 180^\circ$ $\because$ EAF is a straight line

$\Rightarrow z^\circ + y^\circ = 180^\circ$

$\Rightarrow z + y = 180$

Now, $x + y + z = 23 + 180 = 203$

Hence, the correct answer is option b.

Question:81

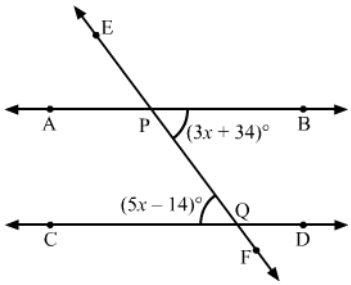
In Fig. 97, if AB is parallel to CD, then the value of $\angle BPE$ is

a 106°

b 76°

c 74°

d 84°



Solution:

Since, AB || CD

$\therefore \angle BPQ = \angle PQC$ Alternate interior angles

$\Rightarrow (3x + 34)^\circ = (5x - 14)^\circ$

$\Rightarrow 3x + 34 = 5x - 14$

$\Rightarrow 48 = 2x$

$\Rightarrow x = 24$

$\therefore \angle BPQ = (3 \times 24 + 34)^\circ = 106^\circ$

$\angle BPQ + \angle BPE = 180^\circ$ EF is a straight line

$\Rightarrow 106^\circ + \angle BPE = 180^\circ$

$\Rightarrow \angle BPE = 74^\circ$

Hence, the correct answer is option c.

Question:82

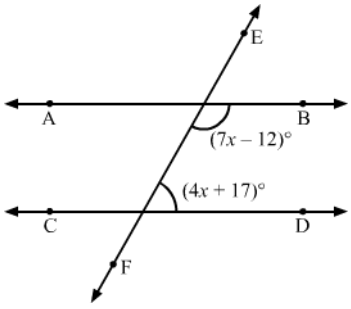
In Fig. 98, if AB is parallel to CO and EF is a transversal, then $x =$

a 19

b 29

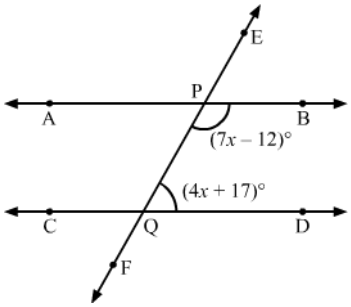
c 39

d 49



Solution:

Let the line EF intersect AB and CD at P and Q respectively.



Since, AB || CD

$\therefore \angle BPQ + \angle PQD = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow (7x - 12)^\circ + (4x + 17)^\circ = 180^\circ$

$\Rightarrow 7x - 12 + 4x + 17 = 180$

$\Rightarrow 11x + 5 = 180$

$\Rightarrow 11x = 175$

$\Rightarrow x = 15.90$

Disclaimer: No option is correct.

Question:83

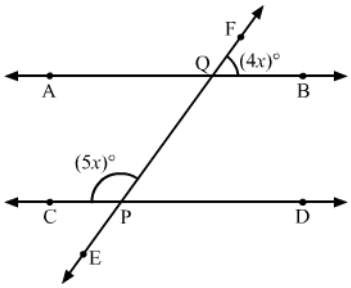
In Fig. 99, AB || CD and EF is a transversal intersecting ABand CO at Pand Q respectively. The measure of $\angle DPQ$ is

a 100°

b 80°

c 110°

d 70°



Solution:

$\angle BQF = \angle AQP = (4x)^\circ$ Vertically opposite angles

Since, AB || CD

$\therefore \angle AQP + \angle CPQ = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow (4x)^\circ + (5x)^\circ = 180^\circ$

$\Rightarrow 9x = 180$

$\Rightarrow x = 20$

$\therefore \angle BQF = 4 \times 20^\circ = 80^\circ$

Now, $\angle BQF = \angle DPQ = 80^\circ$ Corresponding angles

Hence, the correct answer is option b.

Question:84

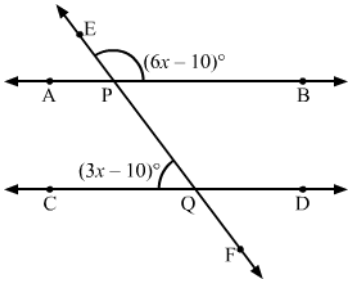
In Fig. 100, AB || CO and EF is a transversal intersecting AB and CD at P and Q respective. The measure of $\angle OOP$ is

a 65

b 25

c 115

d 105



Solution:

$\angle BPE = \angle APQ = (5x - 10)^\circ$ Vertically opposite angles

Since, AB || CD

$\therefore \angle APQ + \angle CQP = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow (5x - 10)^\circ + (3x - 10)^\circ = 180^\circ$

$\Rightarrow 8x - 20 = 180$

$\Rightarrow 8x = 200$

$\Rightarrow x = 25$

$\therefore \angle BPE = (5 \times 25 - 10)^\circ = 115^\circ$

Now, $\angle BPE = \angle DQP = 115^\circ$ Corresponding angles

Hence, the correct answer is option c.

Question:85

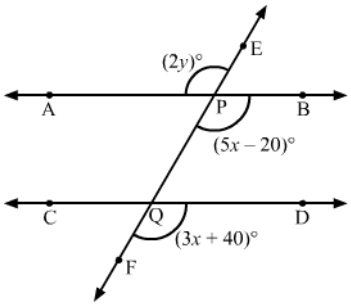
In Fig. 101, AB || CD and EF is a transversal. The value of $y - x$ is

a 30

b 35

c 95

d 25



Solution:

Since, AB || CD

$\therefore \angle BPQ = \angle DQF$ Corresponding angles

$\Rightarrow (5x - 20)^\circ = (3x + 40)^\circ$

$\Rightarrow 5x - 20 = 3x + 40$

$\Rightarrow 2x = 60$

$\Rightarrow x = 30$

$\therefore \angle BPQ = (5 \times 30 - 20)^\circ = 130^\circ$

Now, $\angle APE = \angle BPQ$ Vertically opposite angles

$\Rightarrow 2y^\circ = 130^\circ$

$\Rightarrow y = 65$

$\therefore y - x = 65 - 30 = 35$

Hence, the correct answer is option b.

Question:86

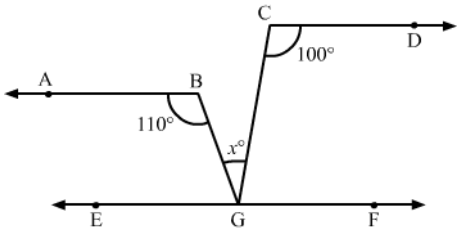
In Fig. 102, AB || CD || EF, $\angle ABG = 110^\circ$, $\angle GCO = 100^\circ$ and $\angle BGC = x^\circ$. The value of x is

a 35

b 50

c 30

d 40



Solution:

Since, AB || EG

$\therefore \angle ABG + \angle EGB = 180°$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 110° + \angle EGB = 180°$

$\Rightarrow \angle EGB = 70°$

Again, CD || GF

$\therefore \angle DCG + \angle FGC = 180°$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 100° + \angle FGC = 180°$

$\Rightarrow \angle FGC = 80°$

Now, $\angle EGB + \angle BGC + \angle FGC = 180°$

$\Rightarrow 70° + x° + 80° = 180°$

$\Rightarrow 150° + x° = 180°$

$\Rightarrow x° = 30°$

$\Rightarrow x = 30$

Hence, the correct answer is option c.

Question:87

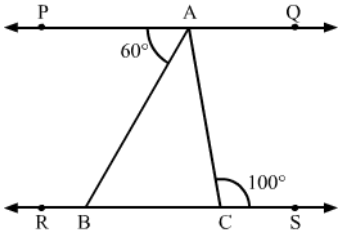
In Fig. 103, PO || RS and $\angle PAB = 60°$ and $\angle ACS = 100°$. Then, $\angle BAC =$

a 40°

b 60°

c 80°

d 50°



Solution:

Since, PQ || RS

$\therefore \angle PAC = \angle ACS = 100°$ Corresponding angles

Now, $\angle PAC = 100°$

$\Rightarrow \angle PAB + \angle BAC = 100°$

$\Rightarrow 60° + \angle BAC = 100°$

$\Rightarrow \angle BAC = 40°$

Hence, the correct answer is option a.

Question:88

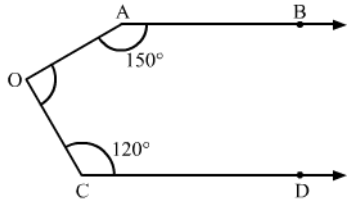
In Fig. 104, AB || CO, $\angle OAB = 150°$ and $\angle OCO = 120°$. Then, $\angle AOC =$

a 80°

b 90°

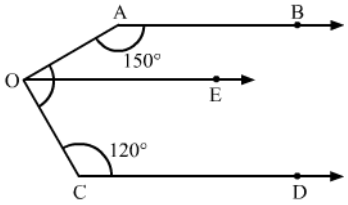
c 70°

d 100°



Solution:

Construction: Draw a line OE from the point O parallel to AB and CD



Since, AB || OE

$\therefore \angle BAO + \angle AOE = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 150^\circ + \angle AOE = 180^\circ$

$\Rightarrow \angle AOE = 30^\circ$

Again, CD || OE

$\therefore \angle DCO + \angle COE = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 120^\circ + \angle COE = 180^\circ$

$\Rightarrow \angle COE = 60^\circ$

Now, $\angle AOC = \angle AOE + \angle COE$

$= 30^\circ + 60^\circ$

$= 90^\circ$

Hence, the correct answer is option b.

Question:89

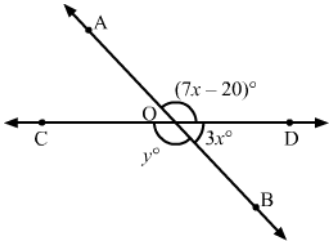
In Fig. 105, if AOB and COD are straight lines. Then, $x + y =$

a 120

b 140

c 100

d 160



Solution:

$\angle AOD + \angle BOD = 180^\circ$ Linear pair angles

$\Rightarrow (7x - 20)^\circ + 3x^\circ = 180^\circ$

$\Rightarrow 7x - 20 + 3x = 180$

$\Rightarrow 10x = 200$

$\Rightarrow x = 20$

$\therefore \angle AOD = (7 \times 20 - 20)^\circ = 120^\circ$

Now $\angle AOD = \angle BOC = 120^\circ$ Vertically opposite angles

$\therefore y = 120$

Now, $x + y = 20 + 120$

$= 140$

Hence, the correct answer is option b.

Question:90

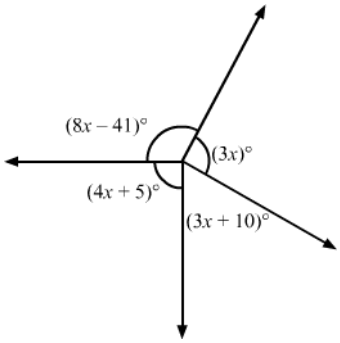
In Fig. 106, the value of x is

a 22

b 20

c 21

d 24



Solution:

$(8x - 41)^\circ + (3x)^\circ + (3x + 10)^\circ + (4x - 5)^\circ = 360^\circ$

$\Rightarrow 8x - 41 + 3x + 3x + 10 + 4x - 5 = 360$

$\Rightarrow 18x - 36 = 360$

$\Rightarrow 18x = 396$

$\Rightarrow x = 22$

Hence, the correct answer is option a.

Question:91

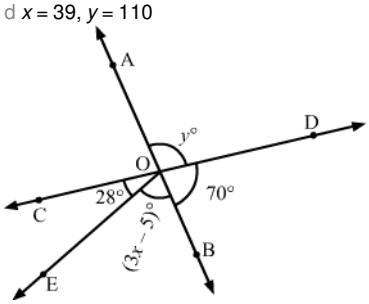
In Fig. 107, if AOBand COD are straight lines, then

a $x = 29, y = 100$

b $x = 110$, y = 29

c $x = 29, y = 110$

d $x = 39, y = 110$



Solution:

$\angle AOD + \angle BOD = 180^\circ$ Linear pair angles

$\Rightarrow y^\circ + 70^\circ = 180^\circ$

$\Rightarrow y^\circ = 110^\circ$

$\Rightarrow y = 110$

Now, $\angle AOC = \angle BOD = 70^\circ$ Vertically opposite angles

Now, $\angle AOC + \angle COE + \angle EOB + \angle BOD + \angle AOD = 360^\circ$ Complete angle

$\Rightarrow 70^\circ + 28^\circ + (3x - 5)^\circ + 70^\circ + 110^\circ = 360^\circ$

$\Rightarrow (3x)^\circ + 273^\circ = 360^\circ$

$\Rightarrow 3x = 87$

$\Rightarrow x = 29$

Hence, the correct answer is option c.

Question:92

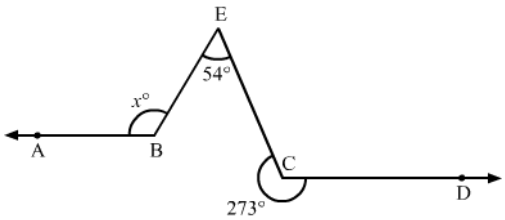
In Fig. 108, if AB || CD then the value of x is

a 87

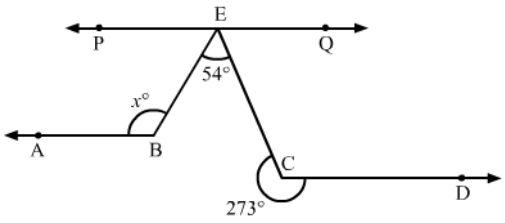
b 93

c 147

d 141



Solution:



Construction: Draw a line PQ parallel to AB which is also parallel to CD

$\angle FCD + \text{Reflex}\angle FCD = 360^\circ$ Complete angle

$\Rightarrow \angle FCD + 273^\circ = 360^\circ$

$\Rightarrow \angle FCD = 87^\circ$

Since, PQ || CD

$\therefore \angle QFC + \angle FCD = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow \angle QFC + 87^\circ = 180^\circ$

$\Rightarrow \angle QFC = 93^\circ$

Now, $\angle ABF = \angle BFQ$ Corresponding angles

$= \angle BFC + \angle QFC$

$= 54^\circ + 93^\circ$

$= 147^\circ$

$\therefore x^\circ = 147^\circ$

$\Rightarrow x = 147$

Hence, the correct answer is option c.

Question:93

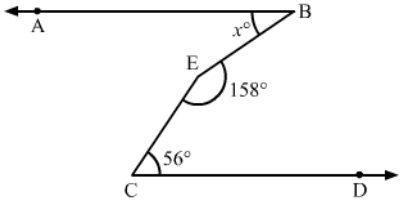
In Fig. 109, if AB || CD then the value of x is

a 34

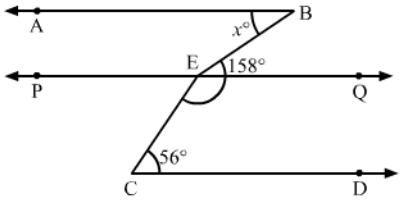
b 124

c 24

d 158



Solution:



Construction: Draw a line PQ parallel to AB which is also parallel to CD

$\angle QEC + \angle ECD = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow \angle QEC + 56^\circ = 180^\circ$

$\Rightarrow \angle QEC = 124^\circ$

Now, $\angle BEQ + \angle QEC = \angle BEC$

$\Rightarrow \angle BEQ + 124^\circ = 158^\circ$

$\Rightarrow \angle BEQ = 34^\circ$

Now, $\angle ABE = \angle BEQ = 34^\circ$ Corresponding angles

$\therefore x^\circ = 34^\circ$

$\Rightarrow x = 34$

Hence, the correct answer is option a.

Question:94

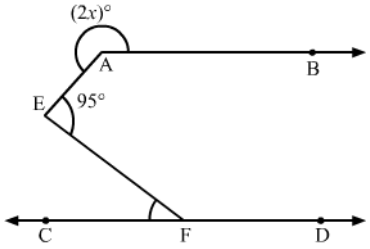
In Fig. 110, if AB || CD. The value of x is

a 122

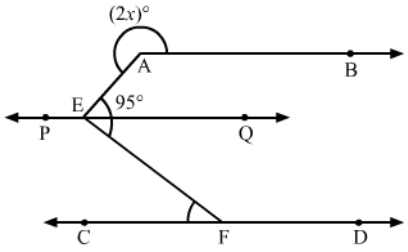
b 238

c 58

d 119



Solution:



Construction: Draw a line PQ parallel to AB which is also parallel to CD

Since, PQ || CD

$\therefore \angle EFC = \angle FEQ = 37^\circ$ Alternate angles

Now, $\angle AEQ + \angle FEQ = \angle AEF$

$\Rightarrow \angle AEQ + 37^\circ = 95^\circ$

$\Rightarrow \angle AEQ = 58^\circ$

Since, PQ || AB

$\therefore \angle EAB + \angle AEQ = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow \angle EAB + 58^\circ = 180^\circ$

$\Rightarrow \angle EAB = 122^\circ$

$\angle EAB + \text{Reflex}\angle EAB = 360^\circ$ Complete angle

$\therefore 122^\circ + (2x)^\circ = 360^\circ$

$\Rightarrow 2x = 238$

$\Rightarrow x = 119$

Hence, the correct answer is option d.

Question:95

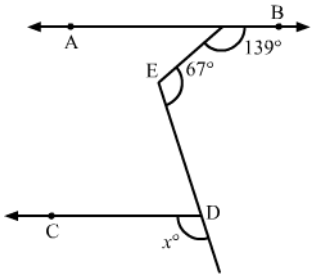
In Fig. 111, if AB || CO then x =

a 154

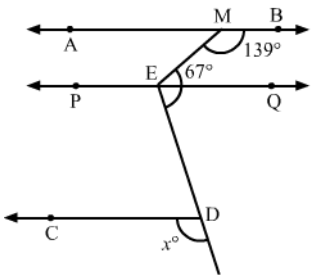
b 139

c 144

d 164



Solution:



Construction: Draw a line PQ parallel to AB which is also parallel to CD

Since, PQ || AB

$\therefore \angle AME + \angle QEM = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 139^\circ + \angle QEM = 180^\circ$

$\Rightarrow \angle QEM = 41^\circ$

Now, $\angle QEM + \angle DEQ = \angle MED$

$\Rightarrow 41^\circ + \angle DEQ = 67^\circ$

$\Rightarrow \angle DEQ = 26^\circ$

Now, $\angle PED + \angle DEQ = 180^\circ$ Linear Pair angles

$\Rightarrow \angle PED + 26^\circ = 180^\circ$

$\Rightarrow \angle PED = 154^\circ$

Since, PQ || AB

$\therefore x^\circ = \angle PED$ Corresponding angles

$\Rightarrow x^\circ = 154^\circ$

$\Rightarrow x = 154$

Hence, the correct answer is option a.

Question:96

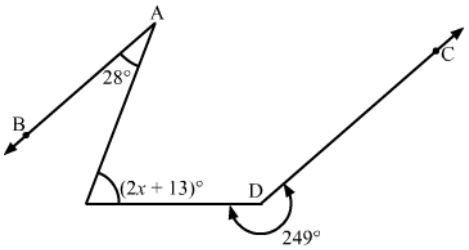
In Fig. 112, if AB || CD, then $x =$

a 32

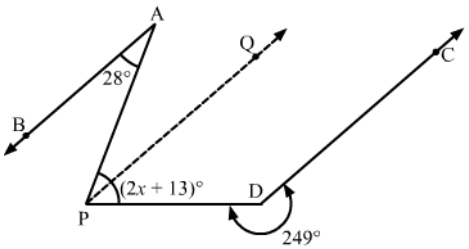
b 42

c 52

d 31



Solution:



Construction: Draw a line PQ parallel to AB which is also parallel to CD

$\angle CDP + \text{Reflex}\angle CDP = 360^\circ$ Complete angle

$\therefore \angle CDP + 249^\circ = 360^\circ$

$\Rightarrow \angle CDP = 111^\circ$

Since, PQ || AB

$\therefore \angle BAP = \angle APQ$ Alternate angles

$\Rightarrow \angle BAP = 28^\circ$

Now, $\angle APQ + \angle QPD = \angle APD$

$\Rightarrow 28^\circ + \angle QPD = (2x + 13)^\circ$

$\Rightarrow \angle QPD = (2x + 13)^\circ - 28^\circ$

Since, PQ || CD

$\therefore \angle QPD + \angle CDP = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow (2x + 13)^\circ - 28^\circ + 111^\circ = 180^\circ$

$\Rightarrow 2x + 13 - 28 + 111 = 180$

$\Rightarrow 2x = 84$

$\Rightarrow x = 42$

Hence, the correct answer is option b.

Question:97

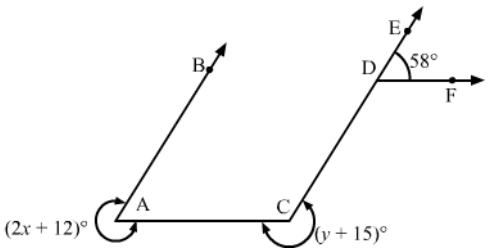
In Fig. 113 if AC || OF and AB || CE, then

a $x = 145, y = 223$

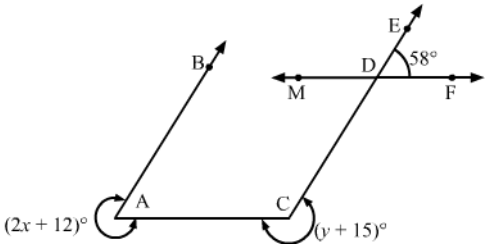
c $x = 135, y = 233$

b $x = 223, y = 145$

d $x = 233, y = 135$



Solution:



Construction: Produce FD towards D to the point M

$\angle DCA + \text{Reflex}\angle DCA = 360^\circ$ Complete angle

$\therefore \angle DCA + (y + 15)^\circ = 360^\circ$

$\Rightarrow \angle DCA = 345^\circ - y^\circ$

Now,

$\angle MDC = \angle EDF = 58^\circ$ Vertically Opposite angles

Since, MF || AC

$\therefore \angle MDC + \angle QPD = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 58^\circ + 345^\circ - y^\circ = 180^\circ$

$\Rightarrow y = 223$

$\therefore \angle DCA = 345^\circ - 223^\circ = 122^\circ$

Again, $\angle BAC + \text{Reflex}\angle BAC = 360^\circ$ Complete angle

$\therefore \angle BAC + (2x + 12)^\circ = 360^\circ$

$\Rightarrow \angle DCA = 348^\circ - (2x)^\circ$

Since, AB || CD

$\therefore \angle DCA + \angle DCA = 180^\circ$ Angles on the same side of a transversal line are supplementary

$\Rightarrow 348^\circ - (2x)^\circ + 122^\circ = 180^\circ$

$\Rightarrow (2x)^\circ = 290^\circ$

$\Rightarrow x = 145$

Hence, the correct answer is option a.