Grade VII

Lesson : 5 LINES AND ANGLES

Objective Type Questions

I. Multiple choice questions

1. A ray has how many end points ?

a) One b) Two c) Three d) Zero

2. What is the sum of the measures of two supplementary angles?

a) 90^0 b) 180^0 c) 360^0 d) 270^0

3. Assume figure, AB ll CD and EF is the transversal. If angles AGH = 60^0, what is the measure of angle DHF?

a) 90^0 b) 120^0 c) 180^0 d) 105^0

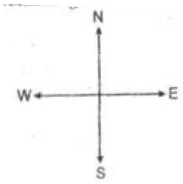
4. A line has how many end points ?

a) One b) Two c) Three d) Zero

5. What is the sum of the measures of two complementary angles?

a) Complementary angles b) Supplementary angles

c) Both acute angles d) both obtuse angles



6. 6. The angles between North and East and North and West are :

a) Complementary angles b) Supplementary angles

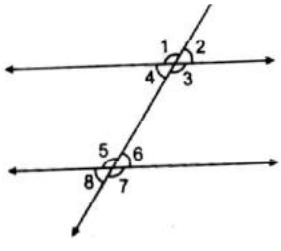
c) both acute angles d) both obtuse angles

7. Which of the following pair of angels supplementary?

a) 48^0 42^0 b) 60^0 60^0 c) 75^0 105^0 d) 179^0 2^0

8. In fig a pair of corresponding angles is :

a) ∠1, ∠2, b. ∠3, ∠6, d) ∠3, ∠5, b. ∠3, ∠7



9. If two lines are intersected by a transversal, then the number of pairs of interior angles on the same side of the transversal is :

a) 1 b) 2 c) 3 d)4

10. The angles between North and West and South and East are.

a) Complementary b) Supplementary c) Both are acute d) Both are obtuse

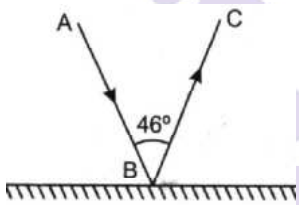
11. Angles between South and West and South and East are:

a) Vertically opposite angles b) Complementary angles

c) Making a linear pair d) Adjacent but not supplementary

12. PQ is a mirror, AB is the incident ray and BC is the reflected ray. If $\angle ABC = 46^0$, Then $\angle ABP$ is equal to :

a) 44^0 b) 67^0 c) 13^0 d) 62^0



13. If the complement of an angle is 79^0 then the angle will be of :

a) 1^0 b) 11^0 c) 79^0 d) 101^0

14. Angles which are both supplementary and vertically opposite are :

a) $95^0, 85^0$ b) $90^0, 90^0$ c) $100^0, 80^0$ d) $45^0, 45^0$

15. The angle which makes a linear pair with an angle of 61^0 is of :

a) 29^0 b) 61^0 c) 122^0 d) 199^0

16. The angle x and 91^0–x are

a) Supplementary b) Complementary

c) Vertically opposite d) making a liner pair

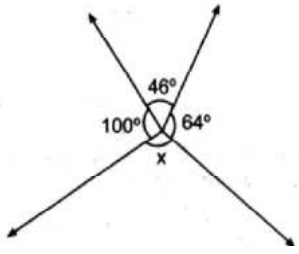
17. The angles x - 10^0–x $190^0$and are:

a) Interior angles on the same side of the transversal b)Making linear pair

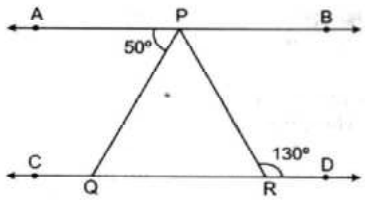
c) Complementary d)Supplementary

18. In Fig.., the value of x is

a) 110^0 b) 46^0 c) 64^0 d) 150^0

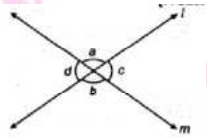


19. In Fig, if AB ll CD, $\angle APQ = 50^0$, and $\angle PRD = 130^0$,then $\angle QPR$ is :



a) 130^0 b) 50^0 c) 80^0 d) 30^0

20. IN Fig., lines l and m intersect each other at a point. Which of the following is false?



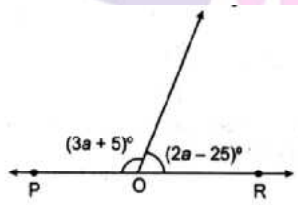
a) $\angle a\ \angle b$, b. $\angle d, \angle c$, d) $\angle a, \angle d, = 180^0$ b. $\angle a, \angle d$

21. If Angle P and angel Q are supplementary and the measure of angles P is 60^0, then the measure of angle Q is :

a) 120^0 b) 60^0 c) 30^0 d) 20^0

22. POR IS A LINE. The value of a is :

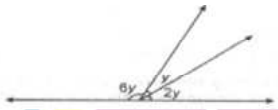
a) 40^0 b) 45^0 c) 55^0 d) 60^0



23.The measure of angle which is four times its supplement is

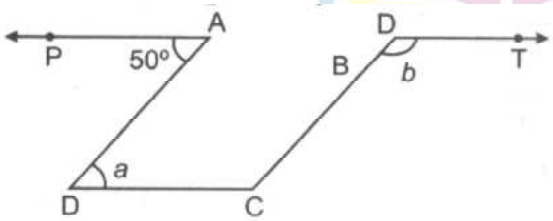
a) 36^0 b) 144^0 c) 16^0 d) 64^0

24. In Fig, the value of y is.



a) 30^0 b) 15^0 c) 20^0 d) 22.5^0

25. PA ll BC ll DT ll AND AB ll DC. Then the values of a and b are respectively.



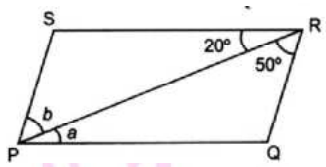
a)$60^0, 30^0$ b)$50^0, 130^0$

c)$70^0, 110^0$ d)$80^0, 100^0$

26. The difference of two complementary angles is 30^0 then the angels are.

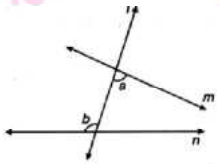
a) $60^0, 30^0$ b) $70^0, 40^0$ c) $20^0, 150^0$ d) $105^0, 75^0$

27 In Fig, PQ || SR and SP || RQ Then angles a and b are respectively:



a) $20^0, 50^0$ b) $50^0, 120^0$ c) $30^0, 50^0$ d) $45^0 35^0$

28. In Fig, a and b are :



a) alternate exterior angles b)Corresponding angles

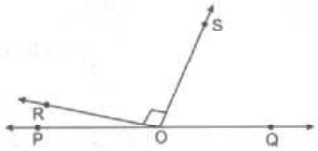
c) Alternate interior angles d) Vertically opposite angles

29. If two supplementary angles are in the ratio 1:2 then the bigger angle is :

a) 120^0 b) 125^0 c) 110^0 d) 90^0

30. In fig., ROS is right angle and POR AND QOS are in the ration 1:5 Then QOS measures .

a) 150^0 b) 75^0 c) 45^0 d) 60^0



31. Statement a and b are as given below:

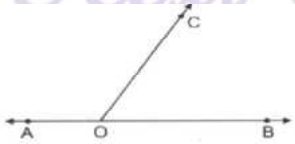
a: If two lines intersect, then the vertically opposite angles are equal

b. If a transversal intersects two other line, then the sum of two interior angles on the same side of the transversal is 180^0

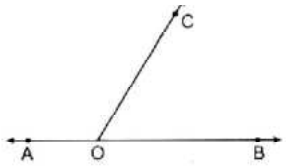
32. For Fig, statements p an q are given below : P:a and b are forming a pair of a adjacent angles then :

a) both p and q are true b) p is true and q is false

c) p is false and q is true d) both p are q are false



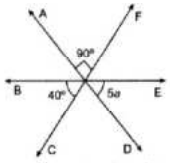
33. In Fig. , $\angle AOC$ and $\angle BOC$ form a pair of .



a) vertically opposite angles b) complementary angles

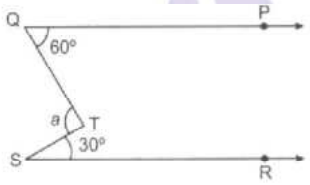
c) alternate interior angles d) supplementary angles

34. In, Fig. The value of a is



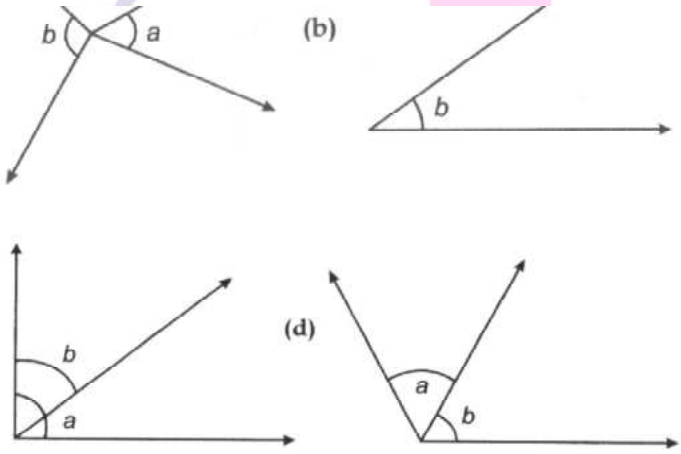
a) 20^0 b)15^0 c)5^0 d)10^0

35. In Fig ., QPII SR the value of a is :



a) 40^0 b)30^0 c)90^0 d)80^0

36. In which of the following figures, a and be are forming a pair of adjacent angles?

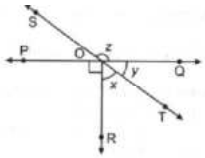


37. In a pair of adjacent angles (i) vertex is always common, (ii) one arm is always common (iii) uncommon arms are always opposite rays: then

a) All (i), (ii) and (iii) are true b) (iii) is false

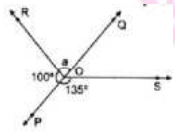
c) (1) is false but (ii) and (iii) are true d) (ii) is false.

38. In Fig., line PQ and ST intersect at O. If $\angle PQR = 90^0$ and x:y = 3:2, then z is equal to :



a) 126^0 b) 144^0 c) 136^0 d) 154^0

39. In Fig., POQ is a line then a is equal to :

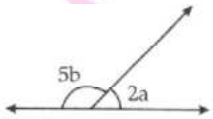


a) 35^0 b) 100^0 c) 80^0 d) 135^0

40. Vertically opposite angels are always:

a) Supplementary b) Complementary c) Adjacent d) equal

41. In Fig., $a = 40^0$. The value of b is

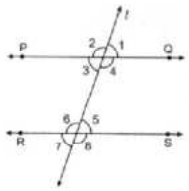


a) 20^0 b) 24 c) 36^0 d) 120^0

42. If an angle is 60^0 less than two times of its supplement then the greater angle is :

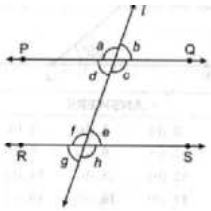
a) 100^0 b) 80^0 c) 50^0 d) 120^0

43. In Fig., PQ II RS If $\angle 1 = 2(a+b)^0$ and $\angle 6 = 3(a-b)^0$ the measure of $\angle 2$ in term of b is :



a) $(2+b)^0$ b) $(3-b)^0$ c) $(108-b)^0$ d) $(180-b)^0$

44. In Fig PQ II RS and a:b = 3:2 Then f is equal to :

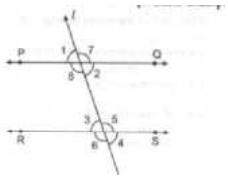


a)36^0 b)108^0 c)72^0 d)144^0

45. In Fig., line l intersects two parallel lines PQ and RS. Then which one of the following is not true?

a) $\angle 1, \angle 3,$ b. $\angle 2, \angle 4$ c) $\angle 6, \angle 7,$ d). $\angle 4, \angle 8$

46. If Fig., which one of the following is not true?

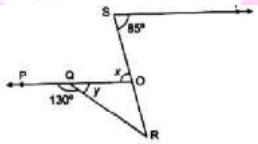


a) $\angle 1, +\angle 3 = 180^0$ b) $\angle 2, +\angle 5 = 180^0$ c) $\angle 3, \angle 8 = 180^0$ d) $\angle 2, \angle 3 = 180^0$

47. In. Fig. Which of the following is true?

a) $\angle 1, \angle 5,$ b) $\angle 4, \angle 8$ c) $\angle 5, \angle 8,$ d) $\angle 3, \angle 7$

48. PQ || S T Then, the value of x + y is :



49. If PQ || RS and QR || TS then the value of a is :

a) 95^0 b) 90^0 c) 85^0 d) 75

1.a	2.b	3.b	4.d	5.a	6.b	7.c	8.d	9.b	10.b
11.c	12.b	13.b	14.b	15.a	16.b	17.d	18.d	19.c	20.d
21.a	22.a	23.b	24.c	25.b	26.a	27.a	28.c	29.a	30.b
31.b	32.a	33.d	34.d	35.c	36.d	37.b	38.b	39.c	40.d
41.a	42.a	43.c	44.b	45.d	46.d	47.c	48.b	49.a	

Hints / Solutions

I. Fill in the blanks

1. If sum of two angles is 90^0 , then the angles are _____ .

2. If the sum of measures of angles is 180^0, then they are _____ .

3. A transversal intersects two or more than two lines are _____ .

If a transversal intersects two parallel lines, then (Q.4 to 7)

4. Sum of interior angles on the same side of a transversal is _____ .

5. Alternate interior angles have one common _____ .

6. Corresponding angles are on the _____ side of the transversal

7. Alternate interior angles are on the _____ side of the transversal

8. Two lines in a plane which do not meet at a point anywhere are called _____ lines.

9. Two angles forming a_____ pair are supplementary.

10. The supplement of an acute angle is always _____ angle.

11. The supplement of a right angle is always _____. angle.

12. The supplement of an obtuse angle is always _____ angle.

13. In a pair of complementary angles, each angle cannot be more than _____. .

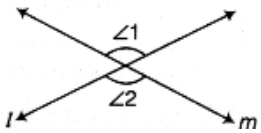
14. An angle is 45^0. Its complementary angles will be _____. .

15. An angle which is half of its supplement is of _____ .

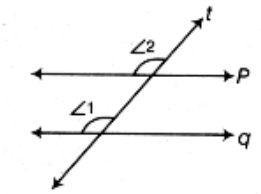
1.Complementary	2.Supplementary	3.Different	4.Supplementary	5.Arm
5.Arm	6.Same	7.Oppoiste	8. Parallel	9.Linear
10.Obtuse	11.right	12.acute	13. 90^0	14. 45^0
15. 60^0				

II. Fill in the blanks

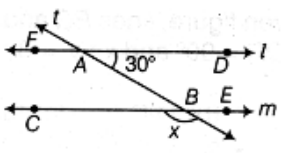
1. In the adjacent figure, if l and m are two straight lines, then ∠1 and ∠2 are …….. angles.



2. In the given figure, the value of x = _____.



3. In the given figure, p and q are two parallel lines then, ∠1 and ∠2 are …….. angles.



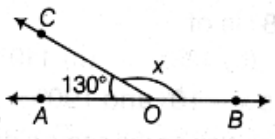
I. True (or) False

1. Two right angles are complementary to each other
2. One obtuse angle and one acute angle can make a pair of complementary angles.
3. Two supplementary angles are always obtuse angles
4. Two right angles are always supplementary to each other
5. One obtuse angles and one acute angle can make a pair of supplementary angles.
6. Both angles of a pair of supplementary angles always from a linear pair
7. Two supplementary angles always from a linear pair
8. Two angles making a linear pair are always adjacent angles
9. Two angles making a linear pair are always adjacent angles.
10. Vertically opposite angles are either both acute angles or both obtuse angles.
11. Interior angles on the same side of a transversal with two distance parallel lines are complementary angles,
12. Vertically opposite angles are either both acute angles or both obtuse angles.
13. A linear pair may have two acute angles.
14. An angle is more than 45^0 Its complementary angle must be less than 45^0.
15. Two adjacent angles always form a linear pair.

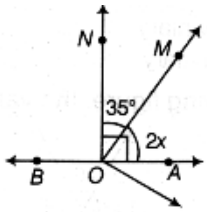
16. True	17.False	18.False	19.True	20.True	21.True	22.True
23. True	24. True	25. False	26. False	27.False	28. False	29. True
30. False						

II. True (or) False

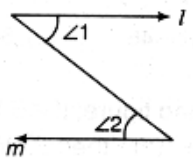
1. In the given figure, the value of $x = 30^0$.



2. In the given figure, the value of x is equal to27.5.



3. In the given figure, the values of ∠1 and ∠2 are equal.

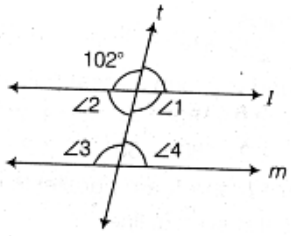


I. Match the following

1. Match column A with Column B.

Column A	Column B
i) Complement of 32^0	a) 100^0
ii) Complement of 42^0	b) 58^0
iii) Complement of 80^0	c) 48^0
iv) Complement of 81^0	d) 99^0

2. Match Column A to Column B on the basis of following figure.
Lines t is transversal line.



Lines l and m are parallel to each other, where

Column A	Column B
i) ∠1 is equal to	a) 102^0
ii) ∠2 is equal to	b) 78^0
iii) ∠3 is equal to	
iv) ∠4 is equal to	

1. Very Short Answer Questions

1. Find the angle which is $\frac{2}{3}$ of its complement

Let angle = x

Its complement = 90^0 - x

$\therefore X = \frac{2}{3} (90^0 - x)$

$\Rightarrow 3x = 180^0 - 2x$

$5x = 180^0$

$x = 36.$

2. Find the angle which is double of its supplement

Let number be x

Its supplement = $180^0 - x$

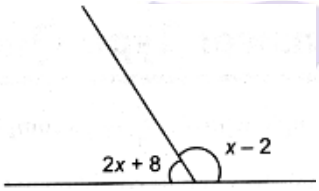
$\therefore X = 2 (180^0 - x)$

$\Rightarrow x = 360^0 - 2x$

$3x = 360$

$X = 120$

3. Find x if :



$2x + 8 + x - 2 = 180^0$

$3x + 6 = 180^0$

$3x = 180^0 - 6$

$3x = 174^0$

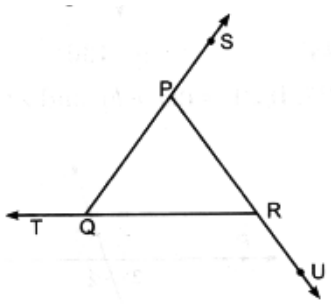
$X = \frac{174^0}{3} = 58$

2. Very Short Answer Questions

1. What is the supplement of a right angle?

Supplement of a right angle is again a right angle.

2. Write each pair of adjacent angle in the given figure (NCERT)



Pairs of adjacent angles are.

i) PQR and PQT

ii) QRU and PRQ

iii) QPR and SPR

3. If the complement of an angle is 62 , then find its supplement. (NCERT)

Complement of 62) = 280 and its supplement (180 – 28) = 152

4. Name the triangle which has 3 congruent sides and 3congruent angles.

Equilateral triangle

5. What are the three properties an adjacent angle has?

Adjacent angles are pair of angles and

i) They have a common vertex;

ii) They have a common arm, and

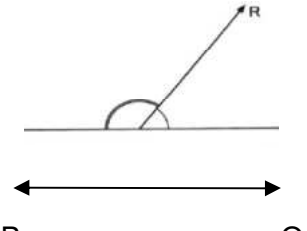
iii) The non common arms are one either side of the common arm.

6. Name the type of angles in the following future.

i) Linear Pair

ii) Adjacent angle

iii) Supplement angle



7. Find the angle which is equal to its complement.

Let the angle be x^0 then its complement be also of x^0.

Now, $x^0 + x^0 = 90$

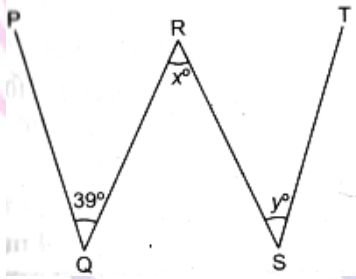
$\Rightarrow x^0 = 45^0$

8. How many numbers of transversals can be drawn for two given lines?

Infinite.

I Short Answer Questions

1. Four line segments PQ , QR, RS and ST are making the letter W, PQ ∥ RS and QR ∥ ST. If angle between PQ and QR is 39^0. Find the value of x and y.



Since PQ RS and QR is transversal. So

$X = 39^0$ [alternate interior angles]

Again QR ST and Rs is a transversal.

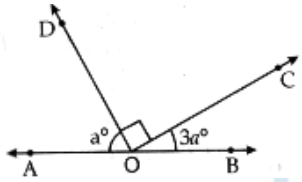
Therefore, $y = x$ [alternate interior angles]

Or $y = 39^0$

2. The point A,O and B are collinear. Ray OC ⊥ ray OD, check whether :

a) ∠AOD and ∠BOC are complementary

b) ∠AOC and ∠BOC are complementary.



Since points A,0 and B are collinear (Given), therefore AB is a straight line,

a) As O is a point on the AB, therefore

$\angle AOD + \angle DOC + \angle BOC = 180^\circ$

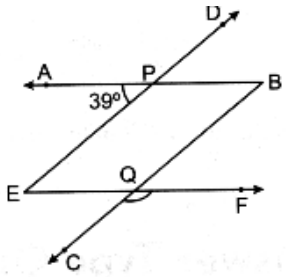
Or, $\angle AOD + \angle BOC + 90^\circ = 180^\circ$

Or, $\angle AOD + \angle BOC = 90^\circ$

So, ∠AOD and ∠BOC are Complementary Angles.

B) Also ∠Aoc And ∠Boc are supplementary as $\angle AOC + \angle BOC = 180^\circ$.

3. AB ‖EF, ED ‖ CB and ∠APE is 39°, find ∠CQF.



Since ED ‖ BC and AB is a transversal, so

So ∠QBP = ∠APE

[Corresponding angles]

Or ∠QBP = 39°

Now, AB ‖ EF and BC is transversal.

Therefore, $\angle FQB = \angle QBP$

[alternate interior angles]

Or $\angle FQB = 39°$

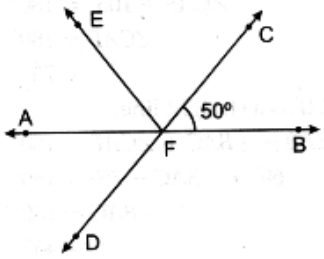
Also $\angle CQF + \angle FQB = 180°$ [linear pair]

So $\angle CQF = 39° = 180°$

Or $\angle CQF = 180° - 39°$

Or $\angle CQF = 141°$

4. CD intersects the line AB at F, ∠CFB $= 50^0$ and $\angle EFA = \angle$ AFD. Find the measure of ∠EFC.



Let ∠EFC = X

Then $\angle AFD = x$

It is given that CD intersects line AB at F.

Therefore ∠CFB = ∠AFD

(vertically opposite angles)

So, x = 50°

But $\angle EFA = \angle AFD, which\ gives \angle EFA =$ = 50°

Now $\angle CFB + \angle EFA + \angle EFC = 180^\circ$

[as AB is a straight line]

Or $50^\circ + 50^\circ + \angle EFC = 180^\circ$

Or $\angle EFC = 180^\circ - 100^\circ$

Thus, $\angle EFC = 80^\circ$

II. Short Answer Questions

1. Find the angle which is $\frac{2}{3}$ of its complement.

1. Let the angle be x and its compliment be $90^\circ - x$

According to question.

$\Rightarrow x = \frac{2}{3}(90^\circ - x)$

$\Rightarrow x = \frac{2}{3} \times 90^\circ - \frac{2}{3}x.$

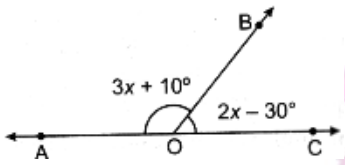
$\Rightarrow + \frac{2}{3}x = 60^\circ$

$\Rightarrow \frac{3x+2x}{3} = 60^\circ$

$\Rightarrow 5x = 180^\circ$

$\Rightarrow X = \frac{180^o}{5} = 36^\circ$

2. Find the value of $\angle AOB$ in the given figure.



In the given figure $\angle AOB$ and $\angle COB$ are the angles of linear pair.

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

$(3x + 10^\circ) + (2x - 30^\circ) = 180^\circ$

$3x + 10^\circ + 2x - 30^\circ = 180^\circ + 20^\circ$

$5x - 20^\circ = 180^\circ$

$5x = 200^\circ$

$X = \frac{200^o}{5}$

Thus, $x = 40^\circ$

Now, $\angle AOB = 3x + 10^\circ$

$= 3\ (40^\circ) + 10^\circ$

$= 120^\circ + 10^\circ = 130^\circ$

III. Short Answer Questions

1. Find the supplement of each of the following angles:

i) 105°

Let supplement angle be x

$\therefore x^\circ + 105^\circ = 180^\circ$

$\Rightarrow x^\circ = 180^\circ - 105^\circ = 75^\circ$

ii) 87

Proceed as above

$\therefore x^\circ + 87^\circ = 180^\circ$

$\Rightarrow x^\circ = 180^\circ - 87^\circ = 93^\circ$

2. Find the angle which is equal to its supplement.

Let the angle be x°

Its supplement angle will also be of x°

Now, $x^\circ + x^\circ = 180^\circ$

$2x = 180 \Rightarrow x^\circ = \frac{180}{2} = 90^\circ$

3. In the adjoining figure, p q. Find the unknown angles.

$\because$ p ∥ q

$\therefore \angle d = 125^\circ$ (Corresponding angle)

Then, $\angle b = \angle d = 180^\circ$ (Vertically opposite angle)

Now, $\angle a + \angle d = 180^\circ$ (Linear pair)

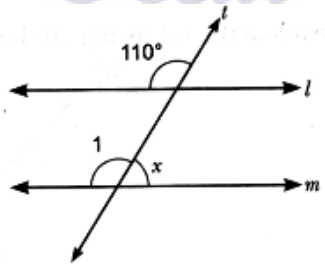
Or $\angle a + 125 = 180^\circ \Rightarrow \angle a = 55^\circ$

Then $\angle a = \angle c = 55^\circ$ (Vertically opposite angle)

$\angle a = \angle c = 55^\circ$ (Corresponding angle)

$\angle e = \angle f = 55^\circ$ (Vertically opposite angle)

4. Find the value of x in each of the following figure if l ∥ m.



As per figure

$\angle 1 + x = 180^\circ$ (Linear pair) .... (i)

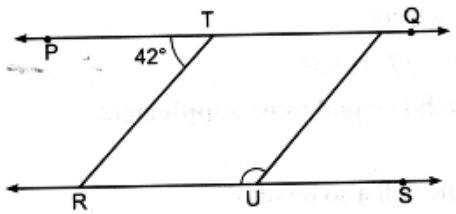
And $\angle 1 = 180^\circ$

From (i) and (ii)

$X = 180^\circ - 110^\circ = 70^\circ$

$\angle x = 70^\circ$

5. In the given figure, PQ ∥ RS, TR ∥ QU and $PTR = 42^\circ$. Find QUR.



$\therefore \angle PTR = 42^\circ$ and TR ∥ QU

and PQ is a transversal

$\therefore \angle TQU = 42^\circ$ (Corresponding angle)

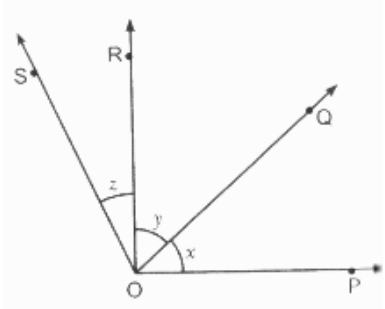
Now , PQ ∥ RS and QU is transversal

$\therefore \angle TQU + \angle QUR = 180^\circ$ (Interior angles of same side)

$42 + \angle QUR = 180^\circ$

$\angle QUR = 180^\circ - 42^\circ = 138.^\circ$

6. In the given figure OR ⊥ OP (NCERT)



i. Name all the pairs of adjacent angles.

ii. Name all the pairs of complementary angles.

i. All the pairs of adjacent angles are :

a) $\angle x$ and $\angle y$

b) $\angle y$ and $\angle x$

c) $\angle x + \angle y$ and $\angle z$

d) $\angle x$ and $\angle y + \angle z$

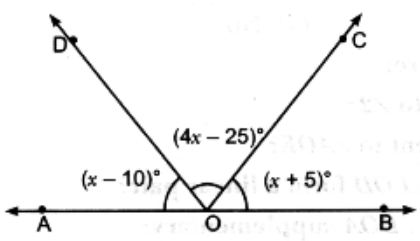
ii. All pairs of complementary angles are $\angle x$ and $\angle y$.

7. In the given figure, find the value of $\angle BOC$, if points A, O and B are collinear. (NCERT)

Since A, O and B are collinear then

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

Or $x - 10 + 4x - 25 + x + 5 = 180^\circ$

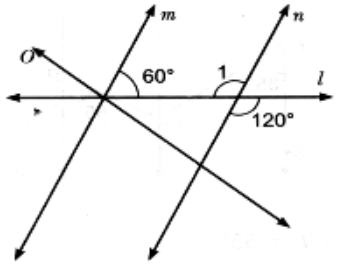


Or $6x - 30^\circ = 180^\circ$

Or $6x = 180^\circ + 30^\circ = 210^\circ$ or $x = \frac{210}{6} = 35^\circ$

$\therefore \angle BOC = x + 5 = 35 + 5 = 40^\circ$

8. In the given figure, state which pair of lines are parallel. Give reason. (NCERT)



From the figure

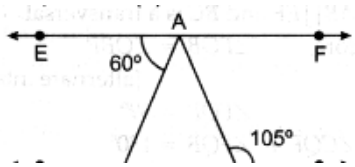
$\angle 1 = 120^\circ$ (vertically opposite angles)

M is parallel to n, while taking l transversal and interior angles 60° and 120 are supplement to each other.

I. Long Answer Questions

1. In the given figure, EF ∥ GH, ∠EAB = 60° and ∠ACH= 105°, then find the values of

a) ∠CAF b) ∠BAC



a) Since EF ∥ GH and AC is transversal.

$\Rightarrow \angle CAF + \angle ACH = 180^\circ$

(interior angles on same side of transversal)

$\Rightarrow \angle CAF + 105^\circ = 180^\circ$

$\Rightarrow \angle CAF = 180^\circ - 105^\circ$

$= 75^\circ$

b) Since EAF is a straight line.

$\therefore \angle EAB + \angle BAC + \angle CAF = 180^\circ$

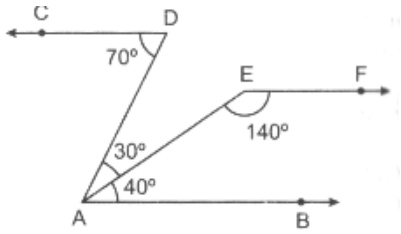
$\Rightarrow 60^\circ + \angle BAC + 75^\circ = 180^\circ$

$\Rightarrow \angle BAC = 180 - 135$

$= 45$

2. In the given figure, show that CD ∥ EF

$\angle BAD = \angle BAE + \angle EAD$



$= 40^\circ + 30^\circ = 70^\circ$

and $\angle CDA = 70^\circ$

$\therefore \angle BAD = \angle CDA$

But they form a pair of alternate angles.

$\Rightarrow AB \parallel CD$

Also, $\angle BAE + \angle AEF = 40^\circ + 140^\circ = 180^\circ$

But they form a pair of interior opposite angles

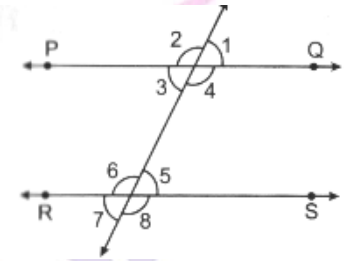
$\Rightarrow AB \parallel EF$

From (i) and (ii), we get

$AB \parallel CD \parallel EF$

$\Rightarrow CD \parallel EF$.

3. In the given figure, PQ $\parallel$ RS. If 1= (2a+b)° and $\angle 6 = (3a-b)^\circ$, then find the measure of $\angle 2$ in terms of b.



Given, $\angle 1 = (2a+b)^\circ$ and $\angle 6 = (3a-b)^\circ$

So, $\angle 1 = \angle 7$ [alternate exterior angles]

So, we have $\angle 7 = (2a + b)^\circ$

$\therefore \angle 6 + \angle 7 = 180^\circ$ [linear pair]

$\Rightarrow (3a-b)+(2a+b)= 180$

$\Rightarrow 3a-b+2a+b = 180^\circ$

$\Rightarrow 5a = 180^\circ$

On dividing both sides by 5 , we get

$\Rightarrow a = \frac{180^0}{5} = 36^\circ$

$\therefore \angle 1 + \angle 2 = 180^\circ$ [linear pair]

$\Rightarrow 2a + b + \angle 2 = 180^\circ$

$\Rightarrow 2 \times 36 + b + \angle 2 = 180^\circ$

$\Rightarrow b + \angle 2 = 180^\circ - 72^\circ$

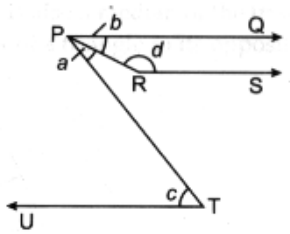
$\Rightarrow b + \angle 2 = 180^\circ$

$\therefore \angle 2 = (108-b)$.

4. In the given figure, PQ RS and UT are parallel lines.

a) If $c = 57^\circ$ and $e = \frac{c}{3}$ then find the value of d.

b) If $c = 75^\circ$ and $a = \frac{2}{5}c$, then fid the value of b.



Given PQ ∥ RS ∥ UT

a) Given, $c = 57^\circ$ and $a = \frac{c}{3}$

$\because$ PQ ∥ UT

$\therefore$ UTP [alternate interior angles]

$\Rightarrow \angle c = \angle a + \angle b$ [$\because$ QPT = a + b]

$\Rightarrow 57^\circ - 19^\circ = \angle b$

$\Rightarrow \angle b = 38$

$\therefore \angle b + \angle d = 180^\circ$

$\Rightarrow \angle d = 180^\circ - 38^\circ = 142^\circ$

b) Given, $c = 75^\circ$ and $a = \frac{2}{5}c$,

$\Rightarrow$ $c = 75^\circ$ and $a = \frac{2}{5} \times 75^\circ = 30^\circ$ [alternate interior angles]

$\Rightarrow 75^\circ = 30^\circ + \angle b$

$\Rightarrow 75^\circ - 30^\circ = \angle b$

$\Rightarrow \angle b = 45^\circ$

II. Long Answer Questions

1. Identify which of the following pairs of angels are complementary and which are supplementary. (NCERT)

i) $65^\circ, 115^\circ$ ii) $63^\circ, 27^\circ$

iii) $112,^\circ 68^\circ$ iv) $130^\circ, 50^\circ$

v) $45^\circ, 45^\circ$ vi) $80^\circ, 10^\circ$

The pair of angles whose sum is 180° are called supplementary while sum is 90° are called complementary.

i) Supplementary ii) Complementary

iii) Supplementary iv) Supplementary

v) Complementary vi) Complementary

2. Can two angles be supplementary if both of them are: . (NCERT)

i) acute ii) obtuse iii) right

i) No ii) No iii) Yes

3. In the adjoining figure:

i) Is ∠1 adjacent to ∠2?

ii) Is ∠AOC adjacent to ∠AOE?

iii) Do ∠COE and ∠EOD form a linear pair?

iv) Are ∠BOD and ∠DOA supplementary?

v) I ∠1 vertically opposite to ∠4?

vi) What is the vertically opposite angle of ∠5?

i) Yes ii) No iii) Yes

iv) Yes v) Yes vi) ∠2 + ∠3

4. In the given figure. l ‖m ‖n. ∠QPS = 35° and QRT= 55°. Find ∠PQR.

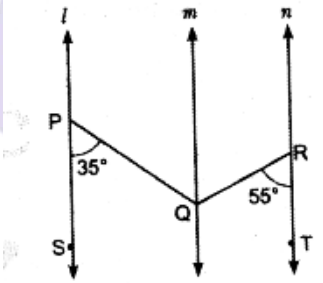
Given l ‖m ‖n

∠QPS = 35° and ∠QRT= 55°.

∵ l ‖m and PQ is a transversal

∴ ∠SPQ = ∠PQM (Alternate interior angle)

Hence, ∠PQM = 35°



Similarly, m ‖ n. and QR is transversal

Hence $\angle QRT = \angle MQR$

Hence ∠MOQ = 55°

Now, ∠PQR = ∠PQM + ∠MQR

From i and (ii)

∠PQR = 354° + 55° = 90°.

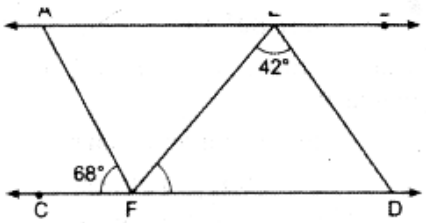
5. In the given figure AB ‖ CD AF ‖ ED, AFC = 68° and FED = 42° Find EFD.

∵ AF ‖ ED and CD is a transversal

∠AFC= ∠EDF = 68° (Corresponding angle)

Now, ΔDEF

∴ $\angle D + \angle E + \angle F = 180°$ (By angle sum property)



68° + 42° +∠F = 180°

∠F = 180° – 68° - 42°

$\angle F = 70°$ Hence, ∠ EFD = 70°