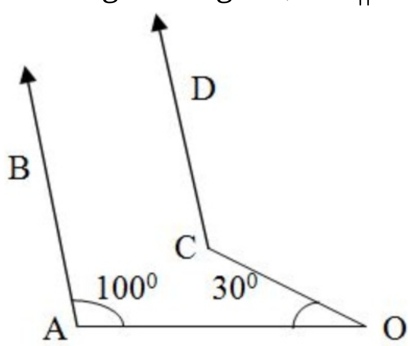
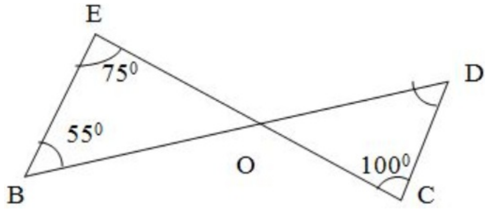
CBSE Test Paper 02

CH-6 Lines and Angles

1. The number of angles formed by a transversal with a pair of parallel lines are
   a. 8
   b. 4
   c. 6
   d. 3
2. In the given figure, AB $||$ CD. If $\angle$AOC = 30° and $\angle$OAB = 100°. then $\angle$OCD =?



   a. 80°
   b. 100°
   c. 130°
   d. 150°
3. If two angles are supplementary and the larger is 20^0 less then three times the smaller, then the angles are :-
   a. $72\frac{1}{2}{}^0, 17\frac{1}{2}{}^0$
   b. $140^0, 40^0$
   c. $130^0, 50^0$
   d. $62\frac{1}{2}{}^0, 27\frac{1}{2}{}^0$
4. In the given figure, $\angle$OEB = 75°, $\angle$OBE = 55° and $\angle$OCD = 100°. Then $\angle$ODC = ?



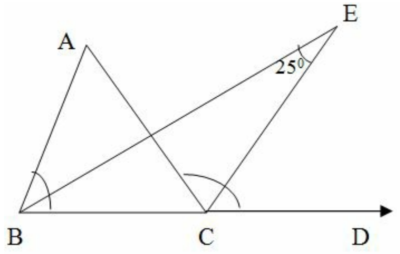
a. 30°

b. 25°

c. 35°

d. 20°

5. In the adjoining figure, BE and CE are bisectors of ∠ABC and ∠ACD respectively. If ∠BEC = 25°, then ∠BAC is equal to :-



a. 50°

b. $25\frac{1}{2}\ ^0$

c. 65°

d. $12\frac{1}{2}\ ^0$

6. Fill in the blanks:

   A line segment has ________ end points.

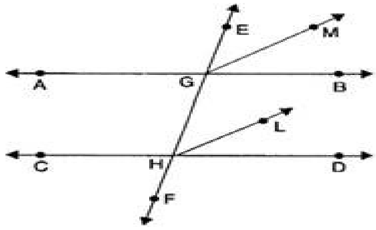
7. Fill in the blanks:

   A line has ________ end point.

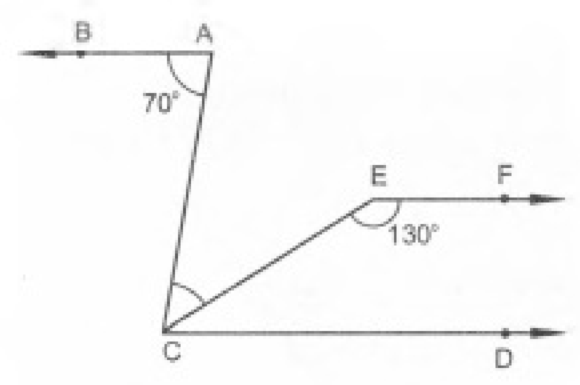
8. An angle is equal to five times its complement. Determine its measure.

9. Two supplementary angles are in the ratio 2 : 3. Find the angles.

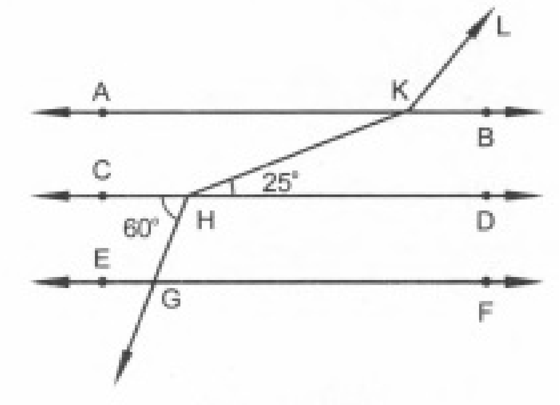
10. If two lines are intersected by a transversal in such a way that the bisectors of a pair of corresponding angles are parallel, then prove that lines are parallel.



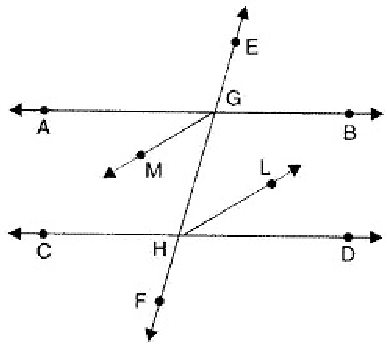
11. In Figure, if AB II CD and CD II EF, find ∠ACE.



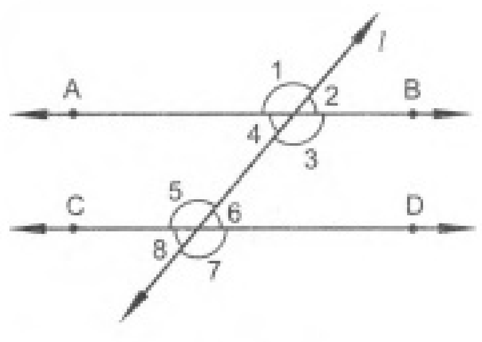
12. In figure, AB || CD || EF and GH || KL. Find ∠HKL.



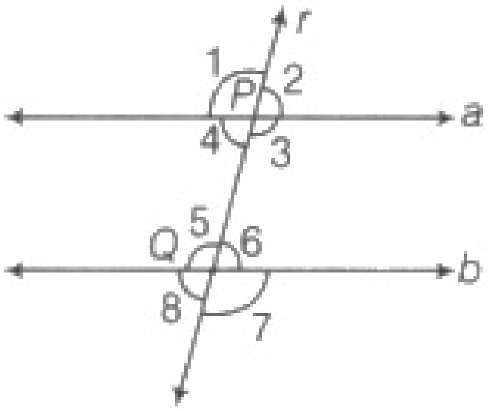
13. If two parallel lines are intersected by a transversal, then prove that the bisectors of any two alternate angles are parallel.



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



15. In the given figure, if ∠2 = 120° and ∠5 = 60°, then show that a || b.



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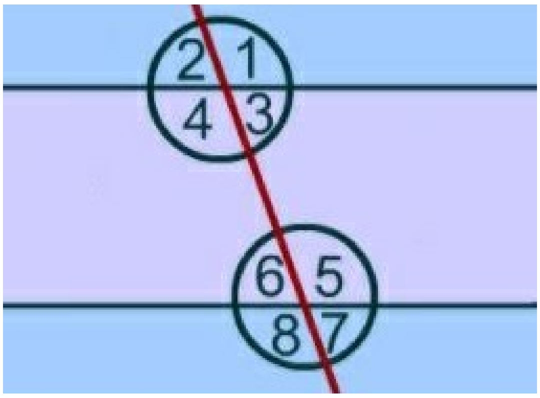
Solution

1. (a) 8

   Explanation:

   As we can see there are 4 angles formed at every point of intersection thus giving a total of 8 angles.

2. (c) 130°

   Explanation:

   Extend line CD which intersect AO at M.

   $\angle$CMO = $\angle$BAO = 100° (Corresponding angle)

   In $\triangle$MOC

   $\angle$MOC + $\angle$CMO = $\angle$DCO (exterior angle is equal to the sum of two opposite interior angles)

   $\angle$DCO = 100° + 30° = 130°

3. (c) 130^0 , 50^0 Explanation:

   Let the two supplimentary angles be x^0 and 180^0 - x^0

   Let 180^0 - x be the larger angle

   $180^0 - x = 3x - 20^0$

   $4x = 200^0$

$x = 50^0$

So the angles are 50^0 and 130^0

4. (a) 30°

   Explanation:

   In $\triangle OEB$
   $\angle OEB + \angle EBO + \angle BOE = 180°$ (Angle sum property)
   $75° + 55° + \angle BOE = 180°$
   $\angle BOE = 50°$
   $\angle BOE = \angle COD = 50°$ (Vertically opposite angle)
   In $\triangle ODC$
   $\angle ODC + \angle DOC + \angle DCO = 180°$
   $\angle ODC = 180° - 100° - 50°$
   $\angle ODC = 30°$

5. (a) 50°

   Explanation:

   In $\triangle BEC$
   $\angle BEC + \angle EBC = \angle ECD$ (Exterior angle property)
   $\angle BEC = \angle ECD - \angle EBC$
   In $\triangle ABC$
   $\angle ABC + \angle BAC = \angle ACD$
   $\angle ABC + 2\angle EBC = 2\angle ECD$
   $\angle ABC = 2(\angle ECD - \angle EBC)$
   $\angle ABC = 2(\angle BEC)$
   $\angle ABC = 50°$

6. two

7. no

8. Let the measure of the given angle be x degrees. Then, the measure of its complement is $(90 - x)°$.

It is given that:

Angle = 5 $\times$ Its complement

$\Rightarrow$ x = 5(90 - x)

$\Rightarrow$ x = 450 - 5x $\Rightarrow$ 6x = 450 $\Rightarrow$ x = 75

Thus, the measure of the given angle is 75°

9. Let the two angles be 2x and 3x in degrees. Then,

   $\therefore$ 2x + 3x = 180

   $\Rightarrow$ 5x = 180 $\Rightarrow$ x = 36

   Thus, the measures of two angles are 2x = 2 $\times$ 36° = 72° and 3x = 3 $\times$ 36° = 108°.

10. GM | | HL . . . .[Given]

    $\therefore$ $\angle$EGM = $\angle$GHL . . . [Corresponding angles]

    $\therefore$ 2$\angle$EGM = 2$\angle$GHL

    $\therefore$ $\angle$EGB = $\angle$GHD . . . [GM bisects the $\angle$EGB and HL bisects the $\angle$GHD]

    These angles form a pair of equal corresponding angles for lines AB and CD and transversal EF.

    $\therefore$ AB | | CD

11. Since EF | | CD

    $\therefore$ $\angle$FEC + $\angle$ECD = 180^o [co-interior angles are supplementary]

    $\Rightarrow$ $\angle$ECD = 180^o - 130^o = 50^o

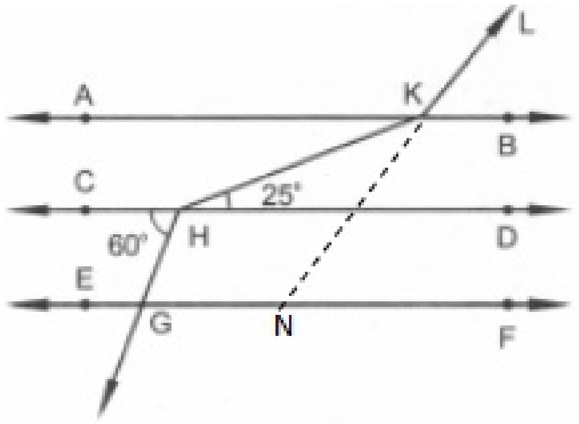
    Also BA | | CD

    $\Rightarrow$ $\angle$BAC = $\angle$ACD = 70^o [alternate interior angles]

    But $\angle$ACE + $\angle$ECD = $\angle$ACD = 70^o

    $\Rightarrow$ $\angle$ACE = 70^o - 50^o = 20^o

12.



Produce LK to meet GF at N.

Now,

$\angle CHG = \angle HGN = 60^{o}$ [alternate angles]

$\angle HGN = \angle KNF = 60^{o}$ [corresponding angles]

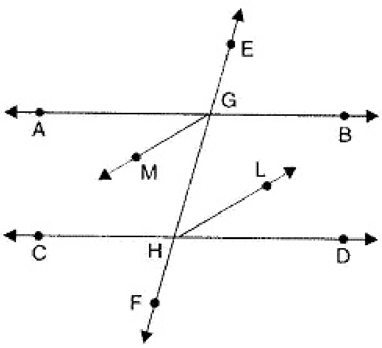
$\therefore \angle KNG = 180^{o} - 60^{o} = 120^{o}$ [linear pair]

$\angle GNK = \angle AKL = 120^{o}$ [corresponding angles]

$\angle AKH = \angle KHD = 25^{o}$ [alternate angles]

$\therefore \angle HKL = \angle AKH + \angle AKL = 25^{o} + 120^{o} = 145^{o}$

13.

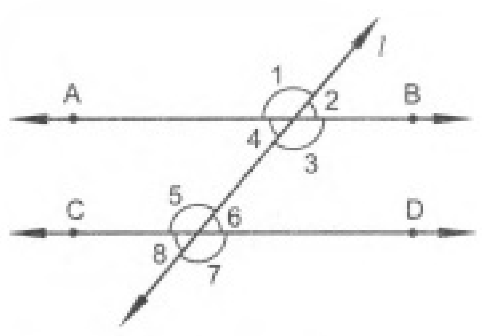


AB || CD and a transversal EF intersects them

$\therefore \angle AGH = \angle GHD$

$\frac{1}{2} \angle AGH = \frac{1}{2} \angle GHD$

$\angle MGH = \angle GHL$ . . . .[As GM bisects the $\angle AGH$ and HL bisects the $\angle GHD$]

14. 

Given In Fig., AB || CD and ∠1 and ∠2 are in the ratio 3 : 2.

To find: All angles from 1 to 8.

Solution: Let ∠1 = 3x, ∠2 = 2x [Given]

Now, ∠1 + ∠2 = 180^o [linear pair]

⇒ 3x + 2x = 180^o

⇒ 5x = 180^o

⇒ x = 36^o

∴ ∠1 = 3x = 108^o and ∠2 = 2x = 72^o

∠1 = ∠3 = 108^o [vertically opposite angles]

∠2 = ∠4 = 72^o [vertically opposite angles]

∠1 = ∠5 = 108^o [corresponding angles]

∠2 = ∠6 = 72^o [corresponding angles]

∠5 = ∠7 = 108^o [vertically opposite angles]

∠6 = ∠8 = 72^o [vertically opposite angles]

Hence, ∠1 = ∠3 = ∠5 = ∠7 = 108^o and

∠2 = ∠4 = ∠6 = ∠8 = 72^o

15. Given, ∠2 = 120^o and ∠5 = 60^o

Also, transversal r intersects two lines a and b at P and Q, respectively.

Here, ∠2 = ∠4 [vertically opposite angles]

∴ ∠4 = ∠2 = 120^o

Now, ∠4 + ∠5 = 120^o + 60^o ⇒ ∠4 + ∠5 = 180^o

So, ∠4 and ∠5 are supplementary angles.

Since, a is a straight line.

$\therefore \angle 4 + \angle 3 = 180^o$ [by linear pair axiom]

$\Rightarrow 120^o + \angle 3 = 180^o$

$\Rightarrow \angle 3 = 180^o - 120^o = 60^o$

Now, $\angle 7 = \angle 5 = 60^o$ [vertically opposite angles]

Here, $\angle 7 + \angle 8 = 180^o$ [by linear pair axiom]

$\therefore 60^o + \angle 8 = 180^o$

$\Rightarrow \angle 8 = 180^o - 60^o = 120^o$

$\because \angle 6 = \angle 8 = 120^o$ [vertically opposite angles]

$\therefore \angle 3 + \angle 6 = 60^o + 120^o = 180^o$

So, $\angle 3$ and $\angle 6$ are supplementary angles.

Thus, transversal r intersects lines a and b such that pair of interior angles on the same side of the transversal is supplementary. Hence, lines a and b are parallel.

Hence proved.