Lines and Angles

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Basic Insight

Based on concepts or operations performed on lines, they are;

- Parallel Lines
- Perpendicular Lines
- Transversal

Types of Angles

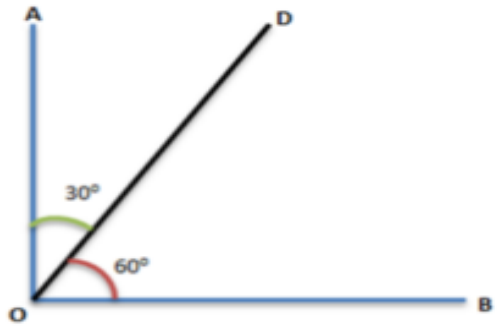
Angles are basically classified as:

- Acute Angle(<90°)
- Right Angle(=90°)
- Obtuse Angle(>90°)
- Straight Angle(=180°)
- Reflex Angle(>180° but <360°)

- Supplementary Angles
- Complementary Angles
- Adjacent Angles
- Vertically Opposite Angles

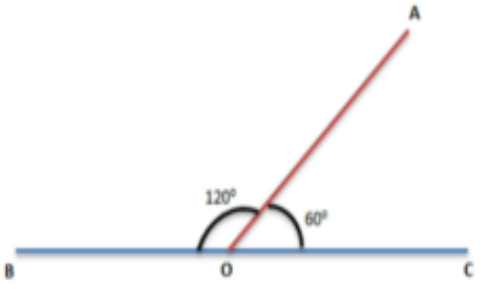
Complementary Angles:

Two angles which sum up to 90 degrees are called complementary angles.



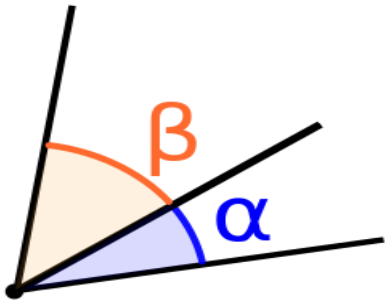
Supplementary Angles:

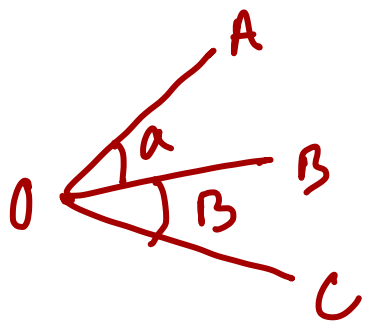
Two angles which sum up to 180 degrees are called supplementary angles.



Adjacent Angles:

Two angles which have a common side and a common vertex are called adjacent angles. In the following figure, ∠α and ∠β are adjacent angles.



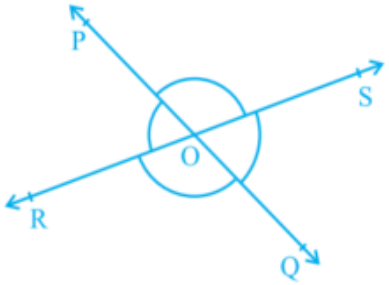


∠AOB - ∠OBC

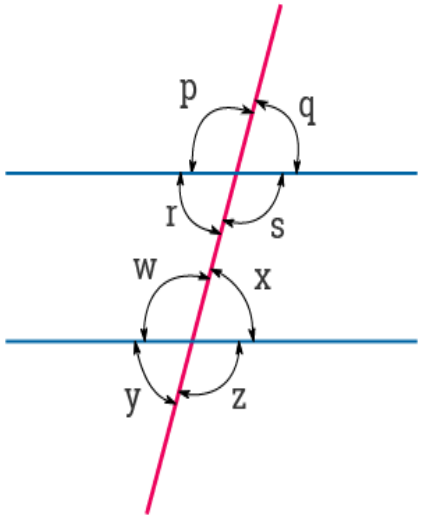
OB

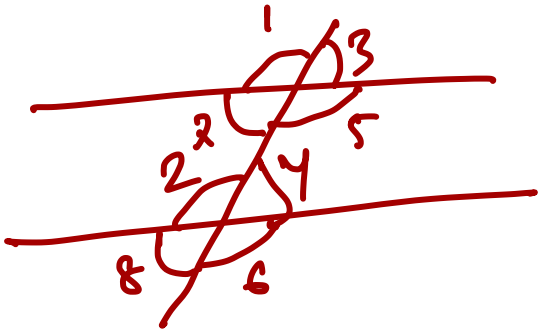
Vertically Opposite Angles:

Two angles which are formed, opposite to each other, when two lines intersect at a common point or vertex, are called vertically opposite angles. In the figure, given below;



Corresponding Angle:

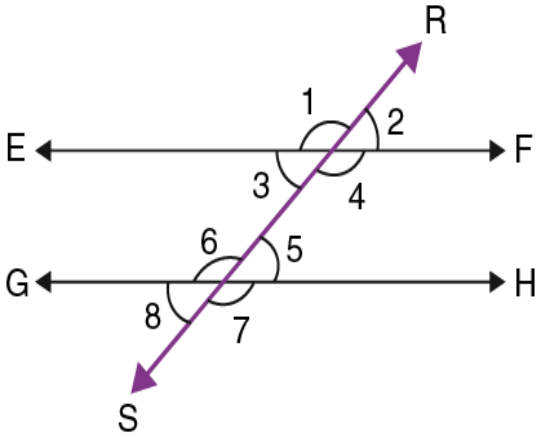


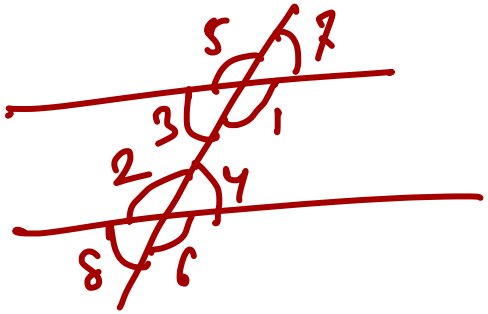


All corresponding angle pairs in the figure:

- ∠q and ∠x
- ∠p and ∠w
- ∠r and ∠y
- ∠s and ∠z

Alternate Angle:





Alternate angles are:

- ∠3 and ∠5
- ∠4 and ∠6
- ∠1 and ∠7
- ∠2 and ∠8

1. Two complementary angle of supplementary angle of 130^0

A. 50
B. 30
C. 40
D. 70

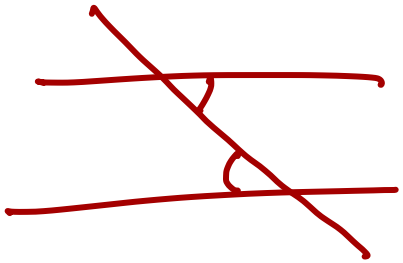
$180 - 130 = 50°$

$90 - 50 = 40°$

2. A pair of parallel lines is intersected by a transversal such that ∠1 and ∠2 form a pair of alternate interior angles. If measure of ∠1 = 75^0, what is the measure of ∠2?

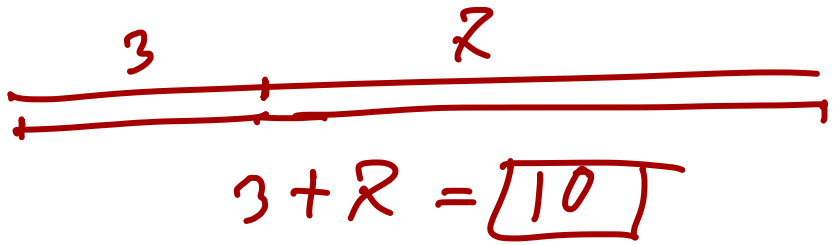
A. 75
B. 15
C. 105
D. 65

∠1 = ∠2



3. If the line segment is divided in the ratio 3:7, then how many parts does it contain while constructing the point of division.

A. 7
B. 4
C. 10
D. 3



4. Two supplementary angles are in the ratio 7:8 find the larger angle measures. (In degree)

~~A. 96~~
B. 94
C. 98
D. 92

$7x + 8x = 180$

$\Rightarrow 15x = 180$

$\Rightarrow x = 12$

$8 \times 12 = 96$

5. Sum of the measure of the interior angles of a polygon is 1620^0. Find the number of sides of the polygon.

A. 11

B. 12

C. 13

D. 14

$(n-2) \times 180^\circ = 1620^\circ$

$\Rightarrow n-2 = 9$

$\therefore n = 11$

Sum of interior angles of a polygon

$= (n-2) \times 180^\circ$

6. If A is 26^0 more than its complementary angle and B is 30^0 less than its supplementary angle then find the value of (A-B)

A. 17

~~B.~~ -17

C. 15

D. -15

x

$A = 26 + x$

$A + x = 90^\circ$

$26 + x + x = 90^\circ$

$2x = 64$

$x = 32$

$\therefore A = 58$

y

$B = y - 30^\circ$

$B + y = 180$

$\Rightarrow y - 30 + y = 180$

$\Rightarrow 2y = 210$

$y = 105$

$\therefore B = 105 - 30$

$= 75$

$A - B = 58 - 75$

$= -12$

7. $\angle A, \angle B$ and $\angle C$ are three angles of a triangle and $\angle\frac{A}{4} + \angle\frac{B}{4} + \angle\frac{C}{5} = 41^\circ$, then find the value of $\angle A + \angle B = ?$

A. 120
B. 100
C. 90
D. 80

$\angle A = 4x \quad \angle B = 4y \quad \angle C = 5z$

$\angle A + \angle B + \angle C = 180$

$\Rightarrow 4x + 4y + 5z = 180$

$\Rightarrow 164 - 4z + 5z = 180$

$z = 16$

$\frac{\angle A}{4} + \frac{\angle B}{4} + \frac{\angle C}{5} = 41$

$\Rightarrow x + y + z = 41$

$\Rightarrow 4x + 4y + 4z = 164$

$\therefore 4x + 4y = 164 - 4z$

$x + y = 41 - 16$

$= 25$

$\Rightarrow 4x + 4y = 100$

$\angle A + \angle B = 100$

8. If the angles, in degrees, of a triangle are x, 3x+20 and 6x, the triangle must be,

A. Acute
B. Right
C. Obtuse
D. Isosceles

$x + 3x + 20 + 6x = 180$

$\Rightarrow 10x = 160$

$x = 16$

6×16

$= 96^\circ$

9. Find the number of diagonals of a regular polygon in which each of the exterior angles 24^0 .

A. 45
B. 36
C. 90
D. 60

Sum of exterior angles = 360°

$$\frac{360}{24} = 15$$

$$\therefore \text{number of diagonal} = \frac{n(n-3)}{2}$$

where, n is the sides of the polygon

$$= \frac{15(15-3)}{2}$$

$$= \frac{15 \times 6}{2}$$

$$= 90$$

10. In a Δ ABC ∠A: ∠B: ∠C = 2: 3: 4. A line CD drawn parallel to BA, then the ∠ACD is

A. 40
B. 60
C. 80
D. 20

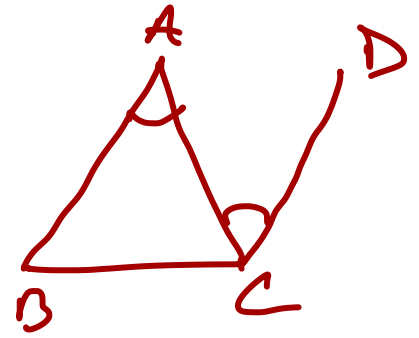
$2x + 3x + 4x = 180$

$\Rightarrow 9x = 180$

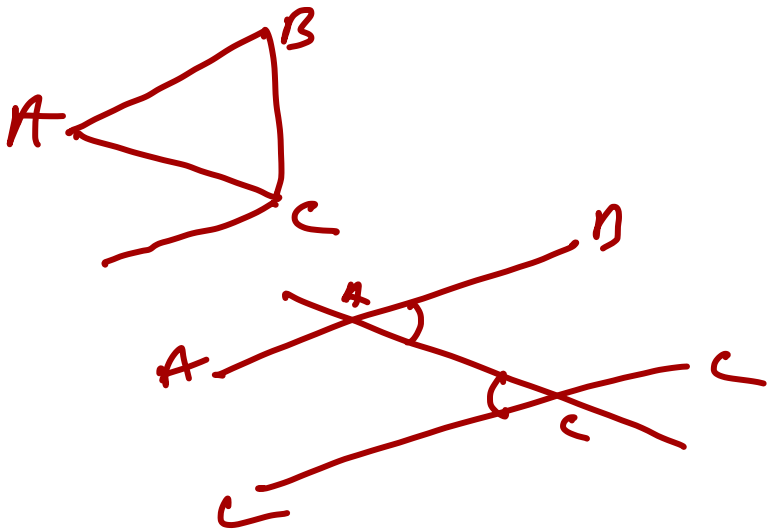
$\Rightarrow x = 20$

$2x = 2 \times 20$

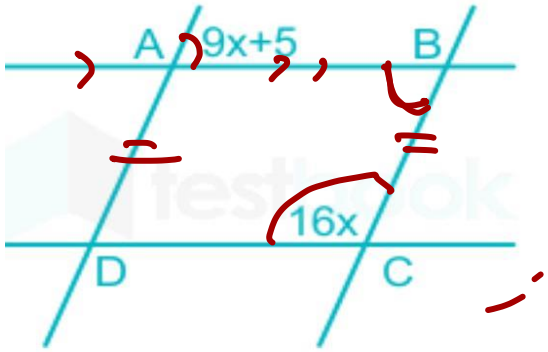
$= 40$



AB || CD



11. Find the measures of angle ABC (in degrees) in the parallelogram as shown in the given figure:



A. 68

B. 112

C. 102

D. 78

$\angle ABC$

$16x + 9x + 5 = 180$

$\Rightarrow 25x = 175$

$\Rightarrow x = 7$

$\angle ABC = 9x + 5$

$= 9 \times 7 + 5$

$= 68$

12. The supplement of an angle is 15^0 more than three times its complement. The measure of the angle is

A. 57.5

B. 65

~~C.~~ 52.5

D. 72.5

x (50)

$(180 - x) = 3(90 - x) + 15$

$\Rightarrow 180 - x = 270 - 3x + 15$

$\Rightarrow 2x = 105$

$x = 52.5$

$180 - \frac{x}{50}$

$= 130$

$90 - \frac{x}{50}$

$= 40$

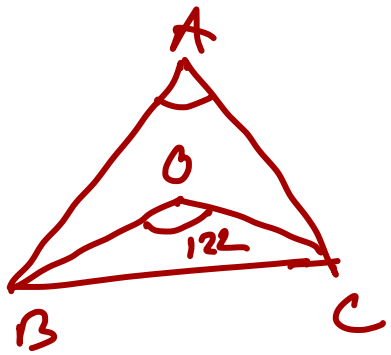
13. In a Δ ABC, the bisectors of ∠B and ∠C meet at point O, inside the triangle if ∠BOC = 122^0, then the measure of ∠A is:

A. 72

B. 64

C. 62

D. 68



$$\angle BOC = 90^\circ + \frac{\angle A}{2}$$

$$\Rightarrow 122 = 90^\circ + \frac{\angle A}{2}$$

$$\Rightarrow 244 = 180 + \angle A$$

$$\Rightarrow \angle A = 64$$

14. The measures of two angles of a triangle are in the ratio 3:7. If the sum of these two measure is equal to the measure of the third angle, then find the smallest angle.

A. 27
B. 3
C. 9
D. 36
E. 54

$3x + 7x + 10x = 180$

$\Rightarrow 20x = 180$

$\therefore x = 9$

$3 \times 9 = 27$

Thank You