## Introduction to Euclid's Geometry

#### IIT Foundation Material

### SECTION - I Straight Objective Type

- **1.** If two altitude of a triangle are equal
- $\Rightarrow$  Corresponding sides are equal
- $\Rightarrow$  The triangle is Isosceles triangle Hence (c) is the correct option.
- Sum of exterior angle of a n-sided is 360° Hence (a) is the correct option.
- **3.** The Centriod divides the median in the ratio 2 : 1 Hence (b) is the correct option.
- **4.** One triangle (4, 6, 8) Hence (c) is the correct option.
- **5.** Sum of two angles is equal to the third angle
- $\Rightarrow$  The third angle is 90°
- $\Rightarrow$  The triangle is right angled triangle
- 6.

7.



- $\Rightarrow \qquad \angle Q = 65^{\circ}$ Hence (c) is the correct option.
- Median devides the triangle into two triangles which are equal in area Hence (a) is the correct option.
- 9. The perimeter of the second triangle  $=\frac{1}{2}(5+6+7)=\frac{1}{2}(18)=9cm$ Hence (c) is the correct option.
- **10.** The diagonals of rhombus bisect one another at right angles Hence (c) is the correct option.





Hence (d) is the correct option.

**12.** OD = 2 cm

Hence (a) is the correct option.

- **13.** the sum of all interior angles of a polygon is (2n-4)90 where *n* is the number of sides for a pentagon n=5
- $\Rightarrow \qquad \text{sum of angles } (2 \times 5 4)90 = 540^{\circ}$ Hence (b) is the correct option.
- **14.** Let angle = x

Complementary angle =90-x 3x=90-x 4x=90  $x=\frac{90}{4}=225$ Complement angle  $=3\times22.5=67.5$ Hence (b) is the correct option.

**15.** Let angle = xSupplementary angle = 180 - x 4x = 180 - x 5x = 180  $x = \frac{180}{5} = 36^{0}$ Hence supplementary angle  $= 36^{0} \times 4 = 144^{0}$ Hence (b) is the correct option

**16.** 
$$120^{\circ} = 2 \times 60^{\circ}$$
  
and  $120 + 60^{\circ} = 180^{\circ}$   
Hence (a) is the correct option

17. Not Available

**18.** 
$$x + y = 70^{\circ}$$
  
 $x - y = 10^{\circ}$   
 $2x = 80^{\circ} \implies x^{\circ} = 40^{\circ}$   
 $y^{\circ} = 30^{\circ}$   
largest angle  $= 180 - (40^{\circ} + 30^{\circ})$   
 $= 110^{\circ}$   
Hence (a) is the correct option.

19.	Isosceles triangle
	Hence (b) is the correct option.

<b>20</b> .	$8 \angle A = 9 \angle B = 4 \angle C$
$\Rightarrow$	$\frac{8\angle A}{72} = \frac{9\angle B}{72} = \frac{4\angle C}{72}$
$\Rightarrow$	$\frac{\angle A}{9} = \frac{\angle B}{8} = \frac{\angle C}{18}$
$\Rightarrow$	$\angle A = 180 \times \frac{9}{25} = 74^{\circ}$ approximately)
	Hence (b) is the correct option.
21.	Two straight lines Hence (b) is the correct option.
22.	Right angled triangle Hence (c) is the correct option.
23.	$2x + 30^{\circ} + 2x - 50^{\circ} = 180^{\circ}$
$\Rightarrow$	$4x^0 = 20^0$
$\Rightarrow$	$x^0 = 50^0$
	Hence (b) is the correct option.
24.	A B E F
	65° x°
	30° y°
	$30^{0} + y^{0} = 65^{0}$ ( :: Alternate angles)
	$y = 35^{\circ}$
	$x^0 + y^0 = 180^0$ (:: Co-interior angles)
	$x^0 + 35^0 = 180^0$

$\Rightarrow$	$x^0 = 180^0 - 35^0$
	$=140^{0}$
	Hence (b) is the correct option.
25.	$x^0 = 30^0$
	Hence (a) is the correct option.
26.	Each interior angle = $160^{\circ}$
	$\frac{(2n-4)90}{100} = 160$
	n = 2n - 4 = 160
$\Rightarrow$	$\frac{1}{n} = \frac{1}{90}$
$\Rightarrow$	18n - 36 = 16n
$\Rightarrow$	2n = 36
	n = 18
	Number of sides $= 18$
	Hence (b) is the correct option.
27.	$\angle EFD = 30^{\circ}$
	Hence (c) is the correct option.
28.	Sum of the angles at a point is $180^{\circ}$
	Hence (c) is the correct option.
29.	$\angle CEF = 140^{\circ}$
	Hence (c) is the correct option.
30.	$\angle QRS = 30^{\circ}$
	Hence (a) is the correct option.
31.	
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 $\angle A + \angle B + \angle C + \angle D + \angle E = 180^{\circ}$  $180^{\circ} = \pi$ Hence (b) is the correct option.

- **32.** Let the angle = xComplement = 90 - x  $\frac{90 - x}{5} = x$   $\Rightarrow \quad 90 = 6x$   $\Rightarrow \quad \frac{90}{6} = x$   $\Rightarrow \quad x^0 = 15^0$ Hence (a) is the correct option.
- **33.** The smallest angle  $= 50^{\circ}$ Hence (c) is the correct option.
- **34.** Rectangle Hence (b) is the correct option.
- **35.** Zero Hence (b) is the correct option.

**36.** 
$$\frac{(2n-4)90}{n} = 135$$
$$\Rightarrow \quad \frac{2n-4}{n} = \frac{135}{90}$$
$$\Rightarrow \quad 4n-8=3n$$
$$\Rightarrow \quad n=8$$
Number of sides = 8  
Hence (c) is the correct option.

**37.** 
$$\frac{(2n-4)90}{n} = \frac{2 \times 360}{n}$$

$\Rightarrow$	2n-4=8 2n=12
$\rightarrow$	n=8 Hence (b) is the correct option.
38.	5, 10 Hence (a) is the correct option.
39.	Any cyclic parallelogram is rectangle Hence (a) is the correct option.
40.	$\angle ADC + \angle DAC = 70^{\circ}$ Hence (c) is the correct option.
41.	Isoscales triangle Hence (b) is the correct option.
42.	Area $(\Delta AEB)$ = Area $(\Delta ACE)$ Hence (c) is the correct option.
43.	Area $(\Delta AEB)$ = Area $(\Delta BFC)$ Hence (c) is the correct option.
44.	The ratio of the areas of two similar Triangle is equal to the ratio of the Squares of corresponding sides Hence (c) is the correct option.
45.	$110^{0}$ Hence (b) is the correct option.
46.	$\angle COP = 90^{\circ}$ Hence (a) is the correct option.
47.	Exterior angle of a pentagon

$$=\frac{360}{5}=72^{\circ}$$
  
Interior angle of a pentagon  
$$=\frac{(2\times5-4)90}{5}$$
$$=18\times6=108^{\circ}$$
  
Hence (d) is the correct option.

**48.** 
$$x^{0} + 2x^{0} + 3x^{0} = 180^{0}$$
  
 $\Rightarrow x^{0} = 30^{0}$   
 $\angle QPB = 30^{0}$   
Hence (c) is the correct option.

**49.** 
$$BC < CA < CD$$
  
Hence (a) is the correct option.

**50.** 
$$\frac{2(n-2)}{2}$$
 right angles

Hence (d) is the correct option.

$$51. \qquad y^0 = 35^0 + 45^0 = 80^0$$

(exterior angles is equal to the sum of interior opposite angles) Hence (b) is the correct option.

**52.** 
$$\frac{360}{n} = 36^{\circ}$$

 $\Rightarrow n=10 \text{ sides}$ Hence (b) is the correct option.

**53.** 
$$\frac{(2n-4)90}{n}:\frac{360}{n}7:2$$

 $\Rightarrow \qquad n=9$ Hence (c) is the correct option.

- 54.  $x^0 = 32^0$ Hence (c) is the correct option.
- **55.** Circum centre Hence (a) is the correct option.
- **56.** EF = THence (b) is the correct option.
- **57.**  $x^0 = 14^0$ Hence (b) is the correct option.
- **58.** 2x-10+5x-20 (co-interior angles)  $\Rightarrow 7x-30^{\circ}=180^{\circ}$

$$\Rightarrow 7x^{0} = 210^{0}$$

$$x^{0} = \frac{210^{0}}{7} = 30^{0}$$
Hence (c) is the correct option.

**59.** Equilateral triangle Hence (a) is the correct option.

- **60.**  $a^0 = 60^0$ Hence (a) is the correct option.
- **61.**  $a^0 = 45^0$ Hence (a) is the correct option.
- **62.**  $x^0 = 25^0 + 30^0 = 55^0$ (:: extrior angle is equal to sum of cointorier angles)  $55^0 + 60^0 + y^0 = 180^0$
- $\Rightarrow \qquad y^0 = 18^0 115^0 = 65^0$ Hence (a) is the correct option.

<b>63</b> .	$y^0 = 60^0$
	Hence (b) is the correct option.
64.	$\angle ABC = 75^{\circ}$ Hence (c) is the correct option.
65.	$25^2 = x^2 + 15^2$
$\Rightarrow$	$x^2 = 625 - 225 = 400 = 20^2$
$\Rightarrow$	x = 20
	Hence (c) is the correct option.
66.	$BC^{2} = 17^{2} - 15^{2} = 289 - 225 = 64 = 82$ BC = 8
	$CD^2 = 25^2 - 15^2 = 625 - 225$
	$=400=20^{2}$
	CD = 20
	BC = CD = 20 + 8 = 28
<b>7</b>	Hence (b) is the correct option.
07.	$3x^{\circ} + 5 + 8x - 15 + 3x + 90^{\circ} = 360^{\circ}$
	$14x^{2} = 360^{2} - 80^{2}$
	$14x^2 = 280^\circ \implies x^2 = 20^\circ$
	mence (a) is the correct option.
68.	$x^0 = 26^0$
	Hence (b) is the correct option.
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- **69.** Perimeter = 60 Hence (b) is the correct option.
- **70.** Perimeter = 44 Hence (a) is the correct option.

- 71. The area of the shaded portion = 284.06 square units.Hence (a) is the correct option.
- 72. area of the shaded portion= 154 square units.Hence (b) is the correct option.
- **73.** Ortho centre Hence (b) is the correct option.
- **74.** The radices of the circle = 17cms Hence (a) is the correct option.
- **75.**  $\frac{1}{3}$  of the circle Hence (a) is the correct option.
- **76.**  $\angle ACB = 48^{\circ}$ Hence (a) is the correct option.
- **77.**  $\angle AOC = 60^{\circ}$ Hence (a) is the correct option.
- 78. 3 cm Hence (c) is the correct option. (2n-4)90 = 2(360)79. n 2n - 4 = 8 $\Rightarrow$  $\Rightarrow$ n = 6Hence (c) is the correct option. (2n-4)90 $\frac{3}{2} = \frac{3}{2}$ <u>n</u> 360 80. п

 $\Rightarrow \frac{2n-4}{4} = \frac{3}{2}$  4n-8=12 4n=20 n=5Number of sides = 5
Hence (b) is the correct option.

## Section - II

Assertion - Reason Questions

- **81.**  $\angle A + \angle B + \angle C = 70^{\circ} + 60^{\circ} + 50^{\circ} = 180^{\circ}$ Hence (a) is the correct option.
- 82. Statement-1 is trueStatement-2 is true but statement -2 is not a correct explination for 1Hence (b) is the correct option,
- **83.** In an equilateral triangle exterior Angle is  $120^{\circ}$  and its interior angle is  $60^{\circ}$ Hence (b) is the correct option.
- **84.** Pythagoras theorem Hence (a) is the correct option.
- **85.** The largest chord in a circle is Diameter and diameter = 2x radius Hence (b) is the correct option.
- **86.** All similar triangles are need not to be congruent Hence (c) is the correct option.
- **87.** Mid-point theorem Hence (a) is the correct option.

- **88.** Vertical angular bisector theorem Hence (a) is the correct option.
- **89.** The sum of angles of a triangle  $=180^{\circ}$ Hence (a) is the correct option.
- **90.** Equal chords are equidistant from the centre Hence (b) is the correct option.

## Section - III

## Linked Comprehension Type

- **91.**  $a^0 = 30^0, b^0 = 25^0$ Hence (a) is the correct option.
- **92.**  $c^0 = 70^0, d^0 = 55^0$ Hence (b) is the correct option.
- **93.**  $e^0 = 30^0$ Hence (c) is the correct option.

94.



Hence (a) is the correct option.

**95.**  $\angle DAC = x^0 = 58^0$ Hence (a) is the correct option.

- **96.**  $\angle B + \angle D = 180^{\circ}$ Hence (c) is the correct option.
- 97. Number of sides  $=\frac{360}{n}=\frac{360}{10}=36$ Hence (a) is the correct option.
- **98.** for 20 sides exterior angle  $=\frac{360}{20}=18^{\circ}$ Hence (c) is the correct option.
- **99.** for 9 sides polygon Exterior angle  $=\frac{360}{20}=40^{\circ}$ Hence (a) is the correct option.

#### 100.



**101.** Area of  $\triangle DEF = \frac{1}{4}$  Area of  $\triangle ABC$ Hence (a) is the correct option.

# **102.** If $AC = 8 \implies DE\frac{1}{2}(AC)$ $=\frac{1}{2}(8)4cm$

Hence (a) is the correct option.

- **103.**  $P + 30^{\circ} = 180^{\circ}$   $\Rightarrow P = 180^{\circ} - 30^{\circ} = 150^{\circ}$ Hence (b) is the correct option.
- **104.**  $9^{\circ} = 2^{\circ} (30^{\circ}) = 60^{\circ}$
- $\Rightarrow P = 180^{\circ} 30^{\circ} = 150^{\circ}$ Hence (b) is the correct option.
- **105.**  $r^0 = 30^0$ (:: The angles in the same segment) Hence (c) is the correct option.



## 108.



## 109.



## 110.

