## EXERCISE 14A PAGE NO: 182

**1. Find the measure of each exterior angle of a regular**
**(i) Pentagon**
**(ii) Hexagon**
**(iii) Heptagon**
**(iv) Decagon**
**(v) Polygon of 15 sides.**

**Solution:**

(i) In a regular pentagon, all sides are same size and measure of all interior angles are Same.

The sum of interior angles of pentagon is

$(n-2) \times 180^o$ where n is the number of sides of polygon.

$(5-2) \times 180^o = 540^o$ here n=5 because penta means 5

Each interior angle= $540/5 = 108^o$

As we know that the sum of interior and exterior angle is $180^0$

Exterior angle + interior angle = $180^0$

Exterior angle + $108^o = 180^0$

Exterior angle = $180^0 - 108^o = 72^0$

(ii) In a regular hexagon, all sides are same size and measure of all interior angles are Same.

The sum of interior angles of pentagon is

$(n-2) \times 180^o$ where n is the number of sides of polygon.

$(6-2) \times 180^o = 720^o$ here n=6 because hexa means 6

Each interior angle= $720/6 = 120^o$

As we know that the sum of interior and exterior angle is $180^0$

Exterior angle + interior angle = $180^0$

Exterior angle + $120^o = 180^0$

Exterior angle = $180^0 - 120^o = 60^0$

(iii) In a regular heptagon, all sides are same size and measure of all interior angles are Same.

The sum of interior angles of heptagon is

$(n-2) \times 180^o$ where n is the number of sides of polygon.

$(7-2) \times 180^o = 900^o$ here n=7 because hepta means 7

Each interior angle= $900/7 = 128.57^o$

As we know that the sum of interior and exterior angle is $180^0$

Exterior angle + interior angle = $180^0$
Exterior angle + $128.57^o$= $180^0$
Exterior angle = $180^0$- $128.57^o$= $51.43^0$

(iv) In a regular decagon, all sides are same size and measure of all interior angles are Same.
The sum of interior angles of decagon is
(n-2) × 180 $^o$ where n is the number of sides of polygon.
(10-2) × 180 $^o$ =1440 $^o$ here n=10 because deca means 10
Each interior angle= 1440/10 = $144^o$
As we know that the sum of interior and exterior angle is $180^0$
Exterior angle + interior angle = $180^0$
Exterior angle + $144^o$= $180^0$
Exterior angle = $180^0$- $144^o$= $36^0$

(v) In a regular polygon, all sides are same size and measure of all interior angles are Same.
The sum of interior angles of polygon of 15 sides is
(n-2) × 180 $^o$ where n is the number of sides of polygon.
(15-2) × 180 $^o$ =1440 $^o$ here n=15
Each interior angle= 2340/15 = $156^o$
As we know that the sum of interior and exterior angle is $180^0$
Exterior angle + interior angle = $180^0$
Exterior angle + $156^o$= $180^0$
Exterior angle = $180^0$- $156^o$= $24^0$

2. **Is it possible to have a regular polygon each of whose exterior angles is $50^0$?**

Solution:
We know that sum of exterior angles of a regular polygon is $360^0$
When we divide the exterior angle we will get the number of exterior angles, since it is a Regular polygon so number of exterior angles is equal to number of sides.
Therefore n=$360^0$/ $50^0$=7.2
And we know that 7.2 is not a integer so it is not possible to have a regular polygon Whose exterior angle is $50^0$

3. **Find the measure of each interior angle of a regular polygon having**
**(i) 10 sides**
**(ii) 15 sides**

Solution:
In a regular polygon having 10 sides, all sides are same size and measure of all interior

Angles are
Same.
The sum of interior angles of polygon is
(n-2) × 180 $^{o}$ where n is the number of sides of polygon.
(10-2) × 180 $^{o}$ =1440 $^{o}$ here n=10
Each interior angle= 1440/10 = 144$^{o}$

(ii) In a regular polygon, all sides are same size and measure of all interior angles are
Same.
The sum of interior angles of polygon of 15 sides is
(n-2) × 180 $^{o}$ where n is the number of sides of polygon.
(15-2) × 180 $^{o}$ =1440 $^{o}$ here n=15
Each interior angle= 2340/15 = 156$^{o}$

**4. Is it possible to have a regular polygon each of whose interior angles is 100$^{o}$?**

Solution:

We know that sum of exterior angles of a regular polygon is 360$^{0}$
As we know that the sum of interior and exterior angle is 180$^{0}$
Exterior angle + interior angle = 180$^{0}$-100$^{0}$=80$^{0}$
When we divide the exterior angle we will get the number of exterior angles, since it is a Regular polygon so number of exterior angles is equal to number of sides.
Therefore n=360$^{0}$/ 80$^{0}$=4.5
And we know that 4.5 is not a integer so it is not possible to have a regular polygon Whose exterior angle is 100$^{0}$

## EXERCISE 14B



**Select the correct answer in each of the following:**

**1. How many diagonals are there in pentagon?**

**(a)5 (b)7 (c)6 (d)10**

**Solution:**

(a)5

**Explanation:**

We know that to calculate number of diagonals in pentagon is

n × (n -3)/2

But here n=5

5 × (5-3)/2 =5

**2. How many diagonals are there in a hexagon?**

**(a) 6 (b) 8 (c) 9 (d) 10**

**Solution:**

(c) 9

**Explanation:**

We know that to calculate number of diagonals in hexagon is

n × (n -3)/2

But here n=6

6 × (6-3)/2 =9

**3. How many diagonals are there in an octagon?**

**(a) 8 (b) 16 (c) 18 (d) 20**

**Solution:**

(d) 20

**Explanation:**

We know that to calculate number of diagonals in octagon is

n × (n -3)/2

But here n=8

8 × (8-3)/2 =20

**4. How many diagonals are there in a polygon having 12 sides?**

**(a) 12 (b) 24 (c) 36 (d) 54**

**Solution:**

(d) 54

**Explanation:**

We know that to calculate number of diagonals in octagon is

$n \times (n-3)/2$

But here n=12

$12 \times (12-3)/2 = 54$

**5. A polygon has 27 diagonals. How many sides does it have?**
**(a) 7 (b) 8 (c) 9 (d) 12**

**Solution:**

(c) 9

**Explanation:**

We know that to calculate number of diagonals in octagon is

Number of diagonals is= $n \times (n-3)/2$

$27 = n \times (n-3)/2$

$n(n-3) = 54$

$n^2 - 3n = 54$

$n^2 - 3n - 54 = 0$

$(n+6)(n-9) = 0$

n=-6 or n=9

So that we are calculating the sides it should be positive, therefore sides of polygon has 27 diagonals is 9

**6. The angles of a pentagon are $x^o$, $(x+20)^o$, $(x+40)^o$, ,$(x+60)^o$ and $(x+80)^o$. The smallest angle of the pentagon is**
**(a) $75^o$ (b) $68^o$ (c) $78^o$ (d) $85^o$**

**Solution:**

(b) $68^o$

**Explanation:**

We know that sum of interior angles of a pentagon is

$(n-2) \times 180^o$

Here n=5

$(5-2) \times 180^o$

$=540^0$

$x+(x+20)+(x+40)+(+60)+(x+80)=540$

$5x + 200 = 540$

$5x = 540-200 = 340$

$5x = 340$

$X=340/5= 68^o$

**7. The measurement of each exterior angle of a regular polygon is $40^o$. How many sides does it have?**
**(a)8 (b)9 (c)6 (d)10**

**Solution:**

(b)9

**Explanation:**

Given exterior angle= $40^o$

But we know that Number of sides = 360/ exterior angle

Number of sides = 360/40=9