EXERCISE 11.2

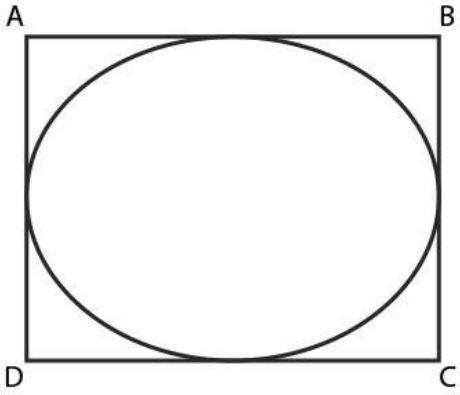
Is the area of the circle inscribed in a square of side a cm, a^2 cm^2? Give reasons for your answer. Solution:

False

Explanation:

Let a be the side of square.

We are given that the circle is inscribed in the square.



Diameter of circle = Side of square = a

Radius of the circle = a/2

Area of the circle = $\pi r^2 = \pi(a/2)^2 = (\pi a^2)/4$ cm^2

Hence, area of the circle is $(\pi a^2)/4$ cm^2

Thus the area of the circle inscribed in a square of side a cm is not a^2 cm^2

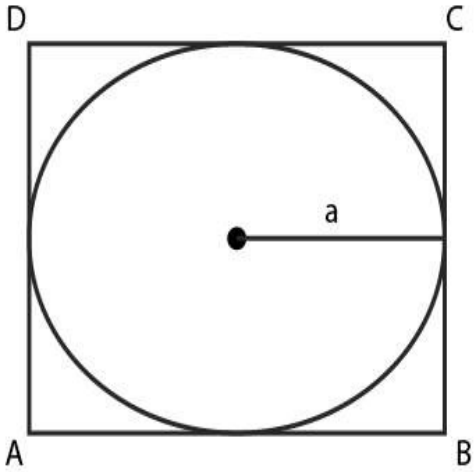
1. Will it be true to say that the perimeter of a square circumscribing a circle of radius a cm is 8a cm? Give reasons for your answer.

Solution:

True

Explanation:

Let r be the radius of circle = a cm



∴ Diameter of the circle = d = 2 × Radius = 2a cm

As the circle is inscribed in the square, therefore,

Side of a square = Diameter of circle = 2a cm

Hence, Perimeter of a square = 4 × (side) = 4 × 2a = 8a cm
Thus, it will be true to say that the perimeter of a square circumscribing a circle of radius a cm is 8a cm.

2. In Fig 11.3, a square is inscribed in a circle of diameter d and another square is circumscribing the circle. Is the area of the outer square four times the area of the inner square? Give reasons for your answer.

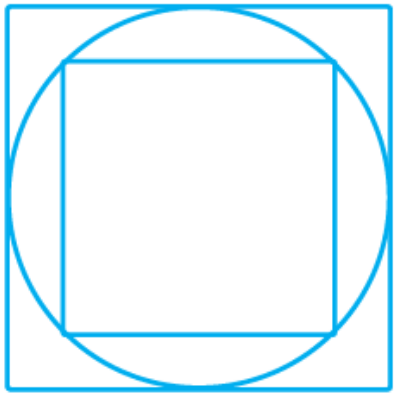


Fig.11.3

Solution:

False
Explanation:
Diameter of the circle = d
Therefore,
Diagonal of inner square EFGH = Side of the outer square ABCD = Diameter of circle = d
Let side of inner square EFGH be a
Now in right angled triangle EFG,
$(EG)^2 = (EF)^2 + (FG)^2$
By Pythagoras theorem)
$\Rightarrow d^2 = a^2 + a^2$
$\Rightarrow d^2 = 2a^2$
$\Rightarrow a^2 = d^2/2$
$\therefore$ Area of inner circle = $a^2 = d^2/2$
Also, Area of outer square = d^2
$\therefore$ the area of the outer circle is only two times the area of the inner circle.
Thus, area of outer square is not equal to four times the area of the inner square.

3. Is it true to say that area of a segment of a circle is less than the area of its corresponding sector? Why?
Solution:

False
Explanation:
It is not true because in case of major segment, area is always greater than the area of its corresponding sector. It is true only in the case of minor segment.
Thus, we can conclude that it is not true to say that area of a segment of a circle is less than the area of its corresponding sector.

4. Is it true that the distance travelled by a circular wheel of diameter d cm in one revolution is 2 d cm? Why?

Solution:

False

Explanation:

Distance travelled by a circular wheel of radius r in one revolution equals the circumference of the circle.

We know that,

Circumference of the circle = 2πd; where d is the diameter of the circle.

Thus, it is not true that the distance travelled by a circular wheel of diameter d cm in one revolution is 2 d cm.

5. In covering a distance s metres, a circular wheel of radius r metres makes s/2πr revolutions. Is this statement true? Why?

Solution:

True

Explanation:

The distance travelled by a circular wheel of radius r m in one revolution is equal to the circumference of the circle = 2πr

No. of revolutions completed in 2πr m distance = 1

No. of revolutions completed in 1 m distance = (1/2πr)

No. of revolutions completed in s m distance = (1/2πr) × s = s/2πr

Thus, the statement "in covering a distance s metres, a circular wheel of radius r metres makes s/2πr revolutions" is true.