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Relationship between Circle and Rectangle by Identity

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Abstract:- In this article, we shall know some identities for length of rectangle and breath of rectangle that truly defines the relationship between area of circle and rectangle. The expressed relation between circle and rectangle in terms of identity will lead to new theories and help in solving complex problems and will make concepts easier to remember and understand.

Keywords:- *Circle: A Round Shaped Closed Figure Having No Edge, Rectangle:- A Closed Figure Having 4 Segments As Its Sides, Area Of Circle = πr^2 Where $\pi = \frac{22}{7}$ And R Is The Radius Of Circle, Circumference Of Circle = $2\pi r$.*

I. INTRODUCTION

Right from beginning of 15th century Lionardo di ser Piero da Vinci a famous Italian artist, scientist and polymath tells about the relation between area of circle and rectangle. He proved that area of circle is equal to area of rectangle in such a way that length of a rectangle is equal to half of length of a circle and breath of a rectangle is equal to radius of a circle but he didn't derive any identity for length of rectangle and breath of rectangle. For furtherance the topic, In this article, we will know two new identities for length of rectangle and breath of rectangle that truly defines the relationship between circle and rectangle.

These formulas will open new door in the branch of mathematics and also enhance the topic's furtherance. All the identities are proved with some questions herewith.

II. EASE OF USE

On approaching several experiments on relation between area of circle and rectangle, we comes to know and arrived at the conclusion that ratio of area of circle to its radius results in length of rectangle formed by the circle always.

Ratio of radius of circle to length of rectangle results in breath of rectangle formed by circle always.From these ratios we derived the two identities which are given below.

➢ *Identity/Expression*

$$\text{Length of rectangle} = \frac{Area\ of\ circle}{Radius\ of\ circle}$$

$$\text{Breath of rectangle} = \frac{Radius\ of\ circle}{Length\ of\ rectangle}$$

➢ *Some Examples for Proving Work*

- We have a circle having $r = 2$

Area of circle$= \pi r^2 = \frac{22}{7} \times 2 \times 2 = 12.57$

Circumerence$= 2\pi r = 2 \times \frac{22}{7} \times 2 = 12.57$

According to Lionardo da vinci, length of rectangle which formed is half of its circumference then

length$= \frac{1}{2} \times 12.57 = 6.285$

By Identity/Formula

Length of rectangle$= \frac{Area\ of\ circle}{Radius\ of\ circle} = \frac{12.57}{2} = 6.285$

Answer

According to Lionardo da vinci, breath of rectangle which formed is equal to radius of circle then

Breath=2

By Identity/Formula

Breath of rectangle$= \frac{Area\ of\ circle}{Length\ of\ rectangle} = \frac{12.57}{6.285} = 2$ **Answer**

- When radius = 3

Area of circle$= \pi r^2 = \frac{22}{7} \times 3 \times 3 = 28.28$

Circumerence$= 2\pi r = 2 \times \frac{22}{7} \times 3 = 18.85$

According to Lionardo da vinci, length of rectangle which formed is half of its circumference then

length$= \frac{1}{2} \times 18.85 = 9.42$

By Identity/Formula

Length of rectangle$= \frac{Area\ of\ circle}{Radius\ of\ circle} = \frac{28.28}{3} = 9.42$ **Answer**

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According to Lionardo da vinci, breath of rectangle which formed is equal to radius of circle then

Breath=3

By Identity/Formula

Breath of rectangle=$\frac{Area\ of\ circle}{Length\ of\ rectangle} = \frac{28.28}{9.42} = 3.00$ **Answer**

- When radius = 4

Area of circle= $\pi r^2 = \frac{22}{7} \times 4 \times 4 = 50.28$

Circumerence= $2\pi r = 2 \times \frac{22}{7} \times 4 = 25.14$

According to Lionardo da vinci, length of rectangle which formed is half of its circumference then

length= $\frac{1}{2} \times 25.14 = 12.57$

By Identity/Formula

Length of rectangle= $\frac{Area\ of\ circle}{Radius\ of\ circle} = \frac{50.28}{4} = 12.57$ **Answer**

According to Lionardo da vinci, breath of rectangle which formed is equal to radius of circle then

Breath=4

By Identity/Formula

Breath of rectangle=$\frac{Area\ of\ circle}{Length\ of\ rectangle} = \frac{50.28}{12.57} = 4$ **Answer**

- When radius = 3.5

Area of circle= $\pi r^2 = \frac{22}{7} \times 3.5 \times 3.5 = 38.5$

Circumerence= $2\pi r = 2 \times \frac{22}{7} \times 3.5 = 22$

According to Lionardo da vinci, length of rectangle which formed is half of its circumference then

length= $\frac{1}{2} \times 22 = 11$

By Identity/Formula

Length of rectangle= $\frac{Area\ of\ circle}{Radius\ of\ circle} = \frac{38.5}{3.5} = 11$ **Answer**

According to Lionardo da vinci, breath of rectangle which formed is equal to radius of circle then

Breath= 3.5

By Identity/Formula

Breath of rectangle=$\frac{Area\ of\ circle}{Length\ of\ rectangle} = \frac{38.5}{11} = 3.5$ **Answer**

III. CONCLUSION

The crucial aim of this article is to introduce you with the new identities. The vital points of this article are some examples which are proved with the identities. These identities are applicable on every type of such problems and help a lot of peoples who concerned with research and mathematics field. It will open new doors to the new theories and complete the relationship between circle and rectangle from every aspect.

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