

CIRCUMFERENCE OF A CIRCLE - It is the length of the boundary of a circle .

$$\text{CIRCUMFERENCE OF A CIRCLE} = 2 \pi r \text{ OR } \pi d$$

AREA OF A CIRCLE = It is the measurement of a surface , enclosed by the perimeter of the circle .

$$\text{AREA OF A CIRCLE} = \pi r^2$$

Example – 6 The circumference of a circle exceeds its diameter by 270 cm . Find its diameter .

Solution – 6 Let the radius of the circle be r cm , its circumference = $2 \pi r$ and diameter is $2 r$.

$$\begin{aligned} \text{Given :} \quad 2 \pi r - 2 r &= 270 \\ 2 r [\pi - 1] &= 270 \\ 2 r \left[\frac{22}{7} - 1 \right] &= 270 \\ 2 r \left[\frac{22-7}{7} \right] &= 270 \\ 2 r \times \frac{15}{7} &= 270 \\ r &= \frac{270 \times 7}{2 \times 15} \\ r &= 63 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Diameter} &= 2 \times \text{radius} \\ &= 2 \times 63 = 126 \text{ cm} \end{aligned}$$

Diameter = 126 cm ANS

Example – 7 Find the diameter of the circle whose circumference is equal to the sum of the circumference of circle with radii 5 cm , 8 cm and 10 cm .

$$\begin{aligned} \text{Solution – 7} \quad \text{FOR THE CIRCLE WITH RADIUS 5 cm} \quad : \quad C &= 2 \pi r \\ C &= 2 \times \frac{22}{7} \times 5 \\ C &= \frac{220}{7} \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{FOR THE CIRCLE WITH RADIUS 8 cm} \quad : \quad C &= 2 \pi r \\ C &= 2 \times \frac{22}{7} \times 8 \\ C &= \frac{352}{7} \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{FOR THE CIRCLE WITH RADIUS 8 cm} & : C = 2 \pi r \\ & C = 2 \times \frac{22}{7} \times 10 \\ & C = \frac{440}{7} \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{SUM OF THE CIRCUMFERENCE} & : \frac{220}{7} + \frac{352}{7} + \frac{440}{7} \\ & : \frac{1012}{7} \text{ cm} \end{aligned}$$

$$\text{Let the radius of the new circle} = R$$

$$\begin{aligned} C & = 2 \pi r \\ \frac{1012}{7} & = 2 \times \frac{22}{7} \times R \\ \frac{1012}{7} & = \frac{44}{7} \times R \end{aligned}$$

$$\frac{1012 \times 7}{7 \times 44} = R$$

$$23 = R$$

$$\begin{aligned} \text{Diameter} & = 2 \times R \\ \text{Diameter} & = 2 \times 23 \\ \text{Diameter} & = 46 \text{ cm} \end{aligned}$$

The diameter of the new circle is 23 cm ANS

Example – 8 The area of the circle is numerically equal to its circumference . Find its area ,
(Take $\pi = 3 . 14$)

$$\begin{aligned} \text{Solution - 8} \quad \text{AREA OF CIRCLE} & = \text{CIRCUMFERENCE OF CIRCLE} \\ \pi r^2 & = 2 \pi r \\ r & = 2 \text{ units} \\ \text{Area of the circle} & = \pi r^2 \\ & = 3 . 14 \times 4 \\ & = 12 . 56 \text{ square units} \end{aligned}$$

Area of the circle = 12 . 56 square units ANS

Example – 9 Find the circumference of circle whose area is equal to the sum of areas of the circles with diameters 10 cm and 24 cm . Give your answer correct to two decimal places .

Solution – 9 Since the diameters of the two circles are 10 cm and 24 cm respectively , the radius will be 5 cm and 12 cm .

$$\begin{aligned}
\text{Sum of the area of these two circles} &= \pi r^2 + \pi r^2 \\
&= \pi \times 5^2 + \pi \times 12^2 \\
&= \pi (25 + 144) \\
&= 169 \pi \text{ square cm .}
\end{aligned}$$

Area of the big circle with Radius (R) = sum of the area of two circles

$$\begin{aligned}
\pi R^2 &= 169 \pi \\
R^2 &= 169 \\
R &= \sqrt{169} \\
R &= 13 \text{ cm}
\end{aligned}$$

$$\begin{aligned}
\text{Required Circumference} &= 2 \pi r \\
&= 2 \times \frac{22}{7} \times 13 \\
&= 81.71 \text{ cm}
\end{aligned}$$

The required circumference = 81.71 cm ANS

Example – 10 The radii of two circles are in the ratio 5 : 8 . If the difference between their areas is 351π square cm , find the area of the bigger circle . ($\pi = 3.14$)

Solution - 10 Let the radii of the two circles be $5x$ and $8x$ cm respectively .

$$\begin{aligned}
\text{DIFFERENCE BETWEEN THE AREAS} &= 351 \pi \\
\pi \times (8x)^2 - \pi \times (5x)^2 &= 351 \pi \\
\pi \times (64x^2 - 25x^2) &= 351 \pi \\
39x^2 &= 351 \\
x^2 &= \frac{351}{39} \\
x^2 &= 9 \\
x &= 3
\end{aligned}$$

$$\text{Radius of the bigger circle} = 8x = 8 \times 3 = 24 \text{ cm}$$

$$\text{Radius of the smaller circle} = 5x = 5 \times 3 = 15 \text{ cm}$$

$$\begin{aligned}
\text{Radius of the bigger circle} &= \pi r^2 \\
&= 3.14 \times (24)^2 \\
&= 1808.64 \text{ square cm .}
\end{aligned}$$

The required circumference = 81.71 cm ANS

- 16) The diameter of a circle is 28 cm . Find its : (i) Circumference [88 cm]
(ii) area [616 cm²]
- 17) The circumference of a circular field is 308 m . Find its (i) radius [49 m]
(ii) area [7546 m²]
- 18) The sum of the circumference and diameter of a circle is 116 cm . Find its radius . [14 cm]
- 19) The radii of two circles are 25 cm and 18 cm . Find the radius of the circle which has circumference equal to the sum of circumference of these two circles . [43 cm]
- 20) The radii of two circles are 48 cm and 13 cm . Find the area of the circle which has its circumference equal to the difference of the circumferences of the given two circles . [3850 cm²]
- 21) The diameters of two circles are 32 cm and 24 cm . Find the radius of the circle having its area equal to the sum of the area of the two given circles . [20 cm]
- 22) The radius of a circle is 5 m . Find the circumference of the circle whose area is 49 times the area of the given circle . [220 m]
- 23) A circle of largest area is cut from a rectangular piece of card – board with dimensions 55 cm and 42 cm . Find the ratio between the area of the circle cut and the area of the remaining card – board . [3 : 2]
- 24) The radii of two circles are in the ratio 3 : 8 . If the difference between their areas is 2695π cm² , find the area of the smaller circle . [1386 cm]
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