# RD Sharma Solutions

# Class 7

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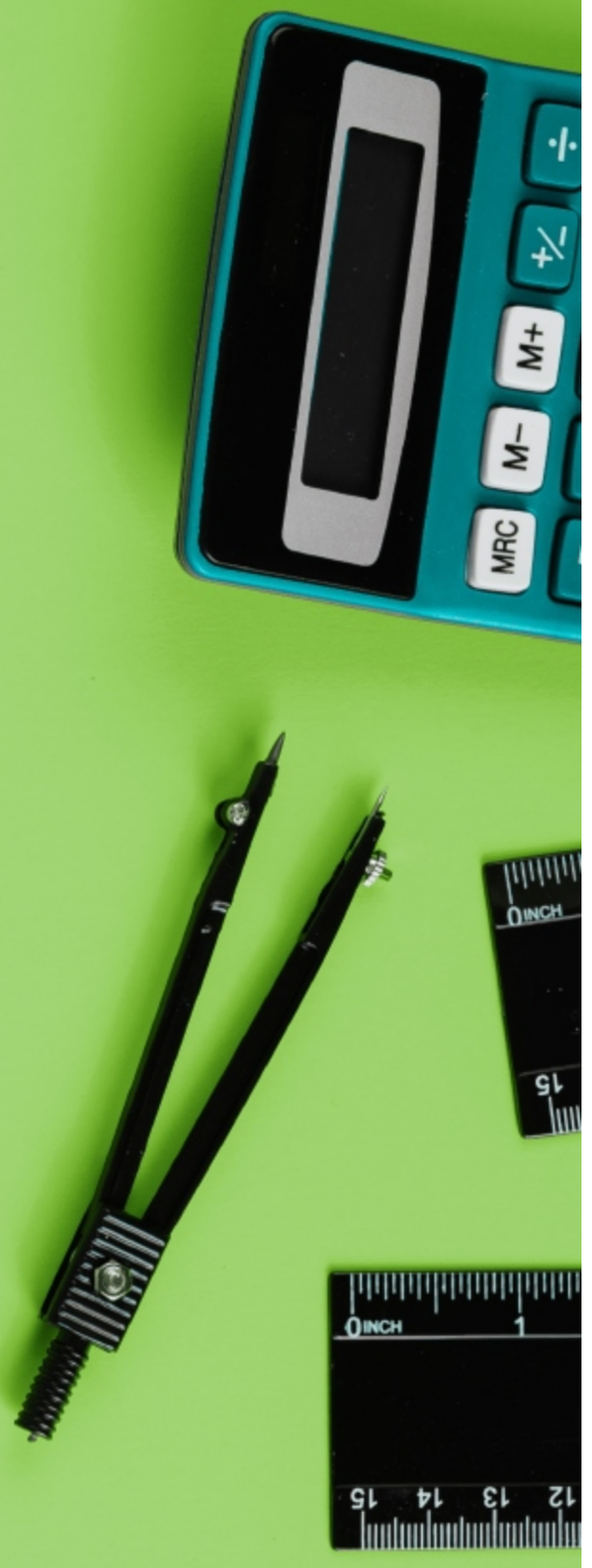

# Exercise 21.2

Q.1 Find the area of a circle whose radius is

(i) 7 cm (ii) 2.1 m (iii) 7 km.

**Solution:** (i) here, $r = 7$ cm

Area of circle $= \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154$ cm

(ii) here $r = 2.1$ m

Area of circle $= \pi r^2 = \frac{22}{7} \times 2.1 \times 2.1$ m$^2$

$= 13.86$ m$^2$

(iii) here $r = 7$ km

Area of circle $= \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154$ km$^2$

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Q.2 Find the area of circle whose diameter is -

(i) 8.4 cm (ii) 5.6 m (iii) 7 km

**Solution:** (i) Diameter $= 8.4$ cm

radius $= \frac{8.4}{2} = 4.2$ cm

Area $= \pi r^2 = \frac{22}{7} \times 4.2 \times 4.2 = 55.44$ cm$^2$

(ii) Diameter $= 5.6$ m

radius $= \frac{5.6}{2} = 2.8$ m

Area $= \pi r^2 = \frac{22}{7} \times 2.8 \times 2.8 = 24.64$ m$^2$

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(iii) Diameter = 7 Km

radius $= \frac{7}{2}$ Km

Area $= \pi r^2$

$= \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} = \frac{77}{2} = 38.5 \text{ Km}^2$

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Q.3 The area of a circle is 154 $cm^2$. Find the radius of the circle.

Solution: Area of circle = 154 $cm^2$

$\pi r^2 = 154$

$\Rightarrow r^2 \times \frac{22}{7} = 154 \Rightarrow r^2 = 49$

$\Rightarrow r = 7$ cm.

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Q.4 Find the radius of a circle, if its area is.

(i) $4\pi$ $cm^2$ (ii) 55.44 $m^2$ (iii) 1.54 $Km^2$

Solution: (i) Area of circle $= 4\pi$

$\Rightarrow \pi r^2 = 4\pi$

$\Rightarrow r^2 = 4 \Rightarrow r = 2$ cm.

(ii) Area = 55.44 $m^2$

$\Rightarrow \pi r^2 = 55.44$

$\Rightarrow \frac{22}{7} r^2 = 55.44 \Rightarrow r^2 = \frac{55.44 \times 7}{22}$ (2.52)

$r^2 = 17.64$

$r^2 = (4.2)^2 \Rightarrow r = 4.2$ m

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(iii) Area $= 1.54\ Km^2$

$$\frac{22}{7} r^2 = 1.54$$

$$r^2 = \frac{1.54 \times 7}{22}$$

$$r^2 = 0.49$$

$$r = 0.7\ Km$$

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Q.5 The circumference of a circle is 3.14m. Find its area.

Solution: $\because 2\pi r = 3.14$

$\Rightarrow 2 \times 3.14 \times r = 3.14$

$\Rightarrow 2r = 1$

$\Rightarrow r = \frac{1}{2}$

hence Area $= \pi r^2 = 3.14 \times \frac{1}{2} \times \frac{1}{2} = \frac{3.14}{4}$

$= 0.785\ m^2$

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Q6 If the area of a circle is $50.24\ m^2$. Find its circumference.

Solution: $\pi r^2 = 50.24$

$\Rightarrow 3.14 \times r^2 = 50.24 \Rightarrow r^2 = \frac{50.24}{3.14}$

$\Rightarrow r^2 = 16 \Rightarrow r = 4\ m$

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Circumference $= 2\pi r$

$= 2 \times 3.14 \times 4 = 25.12\ m$

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Q.7 A horse is tied to a pole with 28 m long string. Find the area where the horse can graze. ($\pi = \frac{22}{7}$)

Solution: here length of rope = radius of circle

$\Rightarrow r = 28\ m$

The area that horse can graze = Area of circle

$= \pi r^2 = \frac{22}{\cancel{7}} \times \cancel{28}^{4} \times 28$

$= 2464\ m^2$

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Q8 A steel wire when bent in the form of a square encloses an area $121\ cm^2$. If the same wire is bent in the form of a circle. Find the area of the circle.

Solution: Area of square $= 121\ cm^2$

$(Side)^2 = (11)^2$

$\Rightarrow$ side of square $= 11\ cm$.

Now, Circumference of circle = Perimeter of square

$\Rightarrow 2\pi r = 4 \times side$

$\Rightarrow 2 \times \frac{22}{7} \times r = 4 \times 11 \Rightarrow r = \frac{4 \times 11 \times 7}{2 \times 22}$

$r = 7\ cm$.

$\therefore$ Area of circle $= \pi r^2$

$= \frac{22}{7} \times 7 \times 7 = 154\ cm^2$

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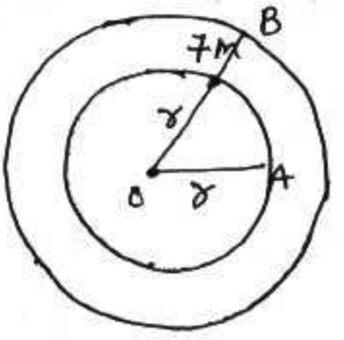
Q.9 A road which is 7m wide surrounds a circular park whose circumference is 352m. Find the area of road.




Solution:

Let radius of park = r m.

$2\pi r = 352$ m

$\Rightarrow 2 \times \frac{22}{7} \times r = 352$

$\Rightarrow r = \frac{352 \times 7}{2 \times 22} = 56$ m

Now radius of outer circle = 56 m + 7 m
= 63 m.

Let $r_1 = 56$ m
$r_2 = 63$ m

Area of Road = Area of outer circle − Area of Inner circle

$= \pi r_2^2 - \pi r_1^2$

$= \pi (r_2^2 - r_1^2) = \frac{22}{7} (63^2 - 56^2)$

$= \frac{22}{7} (3969 - 3136$

$= \frac{22}{7} \times 833 = 22 \times 119$

$= 2618$ m$^2$

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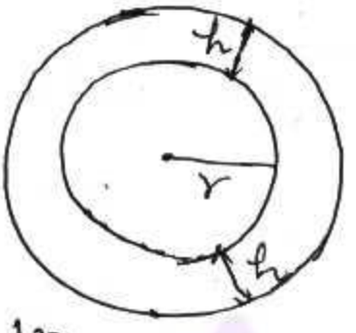
**Q.10** Prove that the area of a circular path of uniform width $h$ surrounding a circular region of radius $r$ is $\pi h(2r+h)$.

**Solution:**




radius of inner circle $= r$ m

width of path $= h$ m

$\therefore$ radius of outer circle $= (r+h)$ m.

Area of path = Area of outer circle − Area of inner circle

$$= \pi(r+h)^2 - \pi r^2$$

$$= \pi\{(r+h)^2 - r^2\} = \pi(\cancel{r^2} + h^2 + 2rh - \cancel{r^2})$$

$$= \pi(h^2 + 2rh)$$

$$= \pi h(h+2r)$$

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**Q.11** The perimeter of a circle is $4\pi$ cm. What is the area of the circle.

**Solution:** $\because 2\pi r = 4\pi$

$\Rightarrow r = 2$ cm.

Area $= \pi r^2$

$= \pi(2)^2 = 4\pi$ cm$^2$

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Q.12 A wire of 5024 m length is in the form of a square. It is cut and made of a circle. Find the ratio of the area of the square to that of the circle.

Solution: $\because$ length of wire $= 5024$ m

$\Rightarrow$ Perimeter of square $= 5024$ m

$\Rightarrow 4a = 5024$

$\Rightarrow a = 1256$ m.

Area of square $= (1256 \times 1256)\ m^2 = 1577536\ m^2$

$\because$ circumference of circle $= 5024$ m.

$\Rightarrow 2\pi r = 5024$

$\Rightarrow 2 \times 3.14 \times r = 5024$

$r = \dfrac{5024}{2 \times 3.14} = 800$

$\therefore$ Area of circle $= (3.14 \times 800 \times 800)$

$= 2009600\ m^2$

Ratio of area of square to area of circle

$= \dfrac{1577536}{2009600} = \dfrac{11}{14}$

$= 11:14$

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Q.13 The radius of a circle is 14 cm. Find the radius of the circle whose area is double of the area of circle.

Sol: here $r = 14$ cm

$A = \pi r^2$

$= \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$

Area of new circle $= 2 \times 616 = 1232 \text{ cm}^2$

let radius $= R$ cm

$\pi R^2 = 1232$

$\Rightarrow \frac{22}{7} \times R^2 = 1232 \Rightarrow R^2 = \frac{1232 \times 7}{22} = 392$

$= R = \sqrt{392} = 14\sqrt{2}$ cm.

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Q.14 The radius of one circular field is 20 m and that of the other is 48 m. Find the radius of the circular field whose area is equal to the sum of the areas of first and second field.

Solution: let radius of first field $r_1 = 20$ m

radius of second field $r_2 = 48$ m

let radius of new field $= r$ cm

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$\because$ Area of new circle = Sum of Areas of both circular field

$\Rightarrow \pi r^2 = \pi r_1^2 + \pi r_2^2$

$\pi r^2 = \pi (r_1^2 + r_2^2)$

$\Rightarrow r^2 = r_1^2 + r_2^2$

$= 20^2 + 48^2$

$= 400 + 2304$

$r^2 = 2704$

$r^2 = (52)^2 \Rightarrow r = 52\,m.$

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Q.15 The radius of one circular field is 5m and that of the other is 13m. Find the radius of the circular field whose area is the difference of the areas of first and second field.

Solution: Let radius of fields ($r_2$) 5 m and ($r_1$) 3 m.

Let radius of new circular field = $r$ m

$\therefore \pi r^2 = \pi r_1^2 - \pi r_2^2$

$\Rightarrow \pi r^2 = \pi (r_1^2 - r_2^2)$

$\Rightarrow r^2 = r_1^2 - r_2^2$

$= 13^2 - 5^2$

$= 169 - 25 = 144\,m.$

$\Rightarrow r = \sqrt{144} = 12\,m.$

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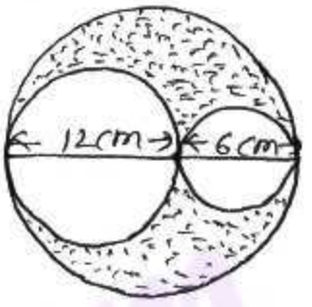
Q.16 Two circles are drawn inside a big circle with diameters $\frac{2}{3}$rd and $\frac{1}{3}$rd of the diameter of the big circle as shown in fig. Find the area of the shaded portion, if the length of the diameter of the circle is 18 cm.




Solution:

given, Diameter of circle = 18 cm

radius = $\frac{18}{2}$ cm = 9 cm.

Diameter of big circle = $\frac{2}{3} \times 18 = 12$ cm.

radius = $\frac{12}{2}$ cm = 6 cm

Diameter of smaller circle = $\frac{1}{3} \times 18 = 6$ cm

radius = $\frac{6}{2}$ cm = 3 cm

Area of shaded portion = Area of circle (r=9) − {Area of big circle (r=6) + Area of smaller (r=3)}

$= \pi(9)^2 - \{\pi(6)^2 + \pi(3)^2\}$

$= 81\pi - \{36\pi + 9\pi\}$

$= 81\pi - 45\pi = 36\pi$ cm$^2$

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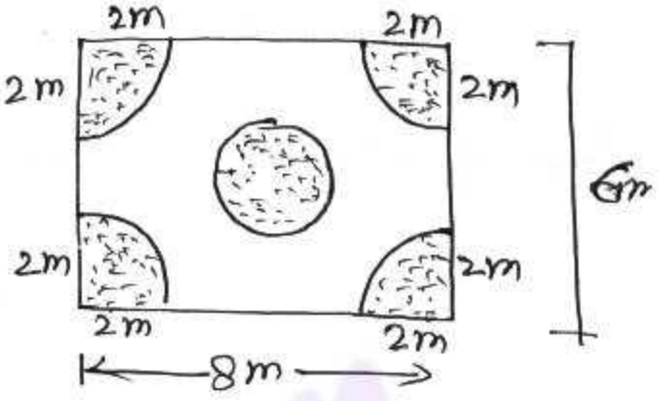
Q.17 In fig. 19, the radius of quarter circular plot taken is 2m and radius of the flower bed is 2m. Find the area of the remaining field.

Solution:




Radius of quarter circular plot = 2m

also radius of flower bed = 2m

∴ Four quarter circle together forms a circle.

Also, length of rectangle = 8m
breadth = 6m

Area of shaded portion = Area of rectangular plot − Area of two circles

$$= (l \times b) - 2(\pi r^2)$$

$$= (8 \times 6) - 2\left(\frac{22}{7} \times 2 \times 2\right)$$

$$= 48 - \frac{176}{7} = 48 - 25.14 \ m^2$$

$$= 22.86 \ m^2$$

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Q.18 Four equal circles, each of radius 5 cm, touch each other as shown in fig. Find the area included between them.

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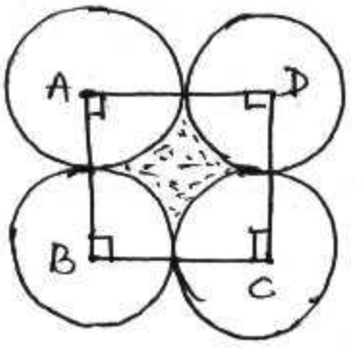
Solution:




radius of circle = 5 cm

∴ side of square = 5+5
= 10 cm

Area of shaded = Area of square − 4 × Area of quadrant of circle

$= (\text{side})^2 - 4\left(\frac{1}{4}\pi r^2\right)$

$= (10)^2 - (3.14 \times 5 \times 5) = 100 - 78.50 \text{ cm}^2$

$= 21.50 \text{ cm}^2$ (Approx)

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Q.19 The area of circle is 100 times the area of another circle. what is the ratio of their circumference

Solution: let radius of circles be $r_1$ and $r_2$

let $\pi r_1^2 = 100 \times \pi r_2^2$

$\Rightarrow \frac{r_1^2}{r_2^2} = \frac{100}{1} \Rightarrow \left(\frac{r_1}{r_2}\right)^2 = \frac{100}{1}$

$\Rightarrow \frac{r_1}{r_2} = \frac{10}{1}$

Now

$\frac{C_1}{C_2} = \frac{2\pi r_1}{2\pi r_2} = \frac{r_1}{r_2}$

$= \frac{10}{1}$

$\therefore C_1 : C_2 = 10 : 1$

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