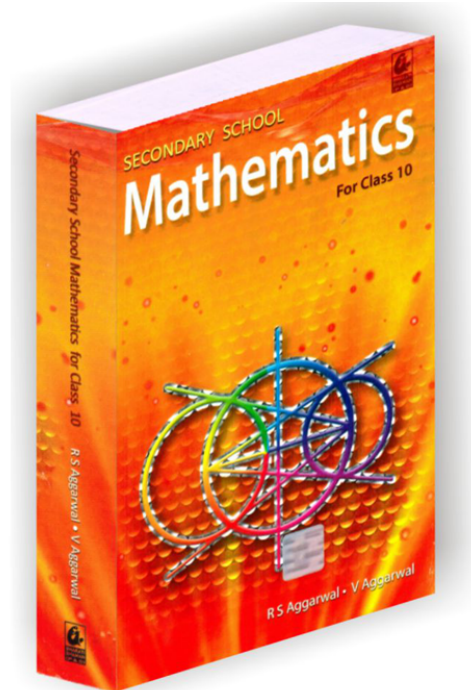


RS Aggarwal Solutions for Class 10 Maths Chapter 16–Areas of Circle, Sector and Segment

Class 10 - Chapter 16 Areas of Circle, Sector and Segment



For any clarifications or questions you can write to info@indcareer.com

Postal Address

IndCareer.com, 52, Shilpa Nagar, Somalwada Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888, **Website:** <https://www.indcareer.com>

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



RS Aggarwal Solutions for Class 10 Maths Chapter 16–Areas of Circle, Sector and Segment

Class 10: Maths Chapter 16 solutions. Complete Class 10 Maths Chapter 16 Notes.

RS Aggarwal Solutions for Class 10 Maths Chapter 16–Areas of Circle, Sector and Segment

RS Aggarwal 10th Maths Chapter 16, Class 10 Maths Chapter 16 solutions

Question 1:

$$\text{Radius} = \frac{\text{Diameter}}{2} = \frac{352}{2} \text{ cm}$$

$$\text{Circumference of circle} = 2\pi r = (2 \times \frac{22}{7} \times 176) \text{ cm} = 1100 \text{ cm}$$

$$\therefore \text{Area of circle} = \pi r^2 = (\frac{22}{7} \times 176 \times 176) \text{ cm}^2$$

$$= 962.5 \text{ cm}^2$$

Question 2:

$$\text{Circumference of circle} = 2\pi r = 39.6 \text{ cm}$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 39.6$$

$$r = \left(39.6 \times \frac{7}{44} \right) \text{ cm} = 6.3$$

$$r = 6.3 \text{ cm}$$

$$\text{Area of circle} = \pi r^2 = \left(\frac{22}{7} \times 6.3 \times 6.3 \right) \text{ cm}^2$$

$$= 124.74 \text{ cm}^2$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Question 3:

$$\text{Area of circle} = \pi r^2 = 301.84$$

$$\Rightarrow r^2 = 301.84 \times \frac{7}{22} = 96.04$$

$$r = \sqrt{96.04} \text{ cm} = 9.8 \text{ cm}$$

$$\text{Circumference of circle} = 2\pi r = (2 \times 22 \times 9.8) = 61.6 \text{ cm}$$

Question 4:

Let radius of circle be r

Then, diameter = $2r$

circumference – Diameter = 16.8

$$\Rightarrow 2\pi r - 2r = 16.8$$

$$\Rightarrow \frac{44}{7}r - 2r = 16.8$$

$$\Rightarrow \frac{30r}{7} = 16.8 \Rightarrow r = \frac{16.8 \times 7}{30} = 3.92 \text{ cm}$$

$$\text{Circumference of circle} = 2\pi r = (2 \times 22 \times 3.92) \text{ cm} = 24.64 \text{ cm}$$

Question 5:

Let the radius of circle be r cm

Then, circumference – radius = 37 cm

$$2\pi r - r = 37$$

$$\frac{44r}{7} - r = 37$$

$$\frac{37r}{7} = 37 \Rightarrow r = \frac{37 \times 7}{37} = 7 \text{ cm}$$

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

Question 6:

$$\text{Area of square} = (\text{side})^2 = 484 \text{ cm}^2$$

$$\Rightarrow \text{side} = \sqrt{484} \text{ cm} = 22 \text{ cm}$$

$$\text{Perimeter of square} = 4 \times \text{side} = 4 \times 22 = 88 \text{ cm}$$

$$\text{Circumference of circle} = \text{Perimeter of square}$$

$$2\pi r = 88 \text{ cm} \Rightarrow r = \frac{88 \times 7}{2 \times 22} = 14 \text{ cm}$$

$$\text{Area of circle} = \pi r^2 = \left(\frac{22}{7} \times 14 \times 14 \right) \text{ cm}^2 = 616 \text{ cm}^2$$

Question 7:

$$\text{Area of equilateral} = \frac{\sqrt{3}}{4} a^2 = 121\sqrt{3}$$

$$a^2 = 121 \times \frac{\sqrt{3}}{\sqrt{3}} \times 4$$

$$a^2 = 484 \Rightarrow a = \sqrt{484}$$

$$a = 22 \text{ cm}$$

$$\text{Perimeter of equilateral triangle} = 3a = (3 \times 22) \text{ cm}$$

$$= 66 \text{ cm}$$

$$\text{Circumference of circle} = \text{Perimeter of circle}$$

$$2\pi r = 66$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\Rightarrow (2 \times 227 \times r) \text{ cm} = 66$$

$$\Rightarrow r = 10.5 \text{ cm}$$

$$\text{Area of circle} = \pi r^2 = (227 \times 10.5 \times 10.5) \text{ cm}^2$$

$$= 346.5 \text{ cm}^2$$

Question 8:

Let the radius of park be r meter

$$\text{Thus, } \pi r + 2r = 90 \Rightarrow \frac{22r}{7} + 2r = 90$$

$$\Rightarrow \frac{36r}{7} = 90 \Rightarrow r = \frac{90 \times 7}{36}$$
$$r = 17.5 \text{ cm}$$

$$\text{Area of semicircle} = \frac{1}{2} \pi r^2 = \left(\frac{1}{2} \times \frac{22}{7} \times 17.5 \times 17.5 \right) \text{ m}^2$$
$$= 481.25 \text{ m}^2$$

Question 9:

Let the radii of circles be x cm and $(7 - x)$ cm

Then,

$$2\pi x - [2\pi(7 - x)] = 8$$

$$2\pi x - [14\pi - 2\pi x] = 8$$

$$2\pi x - 14\pi + 2\pi x = 8$$

$$4\pi x - 14\pi = 8$$

$$2\pi x = 4 + 7\pi$$

$$2\pi x = 4 + 22$$

$$2\pi x = 26$$

Substitute the value of $2\pi x$ in $2\pi(7 - x)$

$$= 14\pi - 2\pi x = 14 \times \frac{22}{7} - 26$$

$$= 44 - 26 = 18 \text{ cm}$$

Circumference of the circles are 26 cm and 18 cm

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Question 10:

Area of first circle = $\pi r^2 = 962.5 \text{ cm}^2$

$$r^2 = \left(962.5 \times \frac{7}{22} \right) \text{ cm}$$

$$r^2 = 306.25$$

$$r = 17.5 \text{ cm}$$

Area of second circle = $\pi R^2 = 1386 \text{ cm}^2$

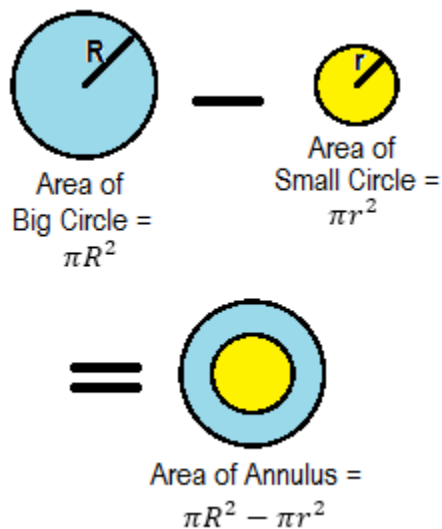
$$R^2 = \left(1386 \times \frac{7}{22} \right) \text{ cm}$$

$$R^2 = 441$$

$$\Rightarrow R = 21 \text{ cm}$$

Width of ring $R - r = (21 - 17.5) \text{ cm} = 3.5 \text{ cm}$

<https://www.youtube.com/embed/m3dwUx5pXj8?feature=oembed>



Question 11:

Area of outer circle = $\pi r^2 = (227 \times 23 \times 23) \text{ cm}^2$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= 1662.5$$

$$\text{Area of inner circle} = \pi r^2 = (22 \times 12 \times 12) \text{ cm}^2$$

$$= 452.2 \text{ cm}^2$$

$$\text{Area of ring} = \text{Outer area} - \text{inner area}$$

$$= (1662.5 - 452.5) \text{ cm}^2 = 1210 \text{ cm}^2$$

Question 12:

Inner radius of the circular park = 17 m

Width of the path = 8 m

Outer radius of the circular park = $(17 + 8) \text{ m} = 25 \text{ m}$

$$\text{Area of path} = \pi[(25)^2 - (17)^2] = \text{cm}^2$$

$$= \pi(25 + 17)(25 - 17) \text{ m}^2$$

$$= \left[\frac{22}{7} \times 42 \times 8 \right] \text{ m}^2$$

$$\text{Area} = 1056 \text{ m}^2$$

Question 13:

Let the inner and outer radii of the circular tracks be r meter and R meter respectively.
Then

$$\text{Inner circumference} = 440 \text{ meter}$$

Since the track is 14 m wide every where.

Therefore,

$$\text{Outer radius } R = r + 14 \text{ m} = (70 + 14) \text{ m} = 84 \text{ m}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\text{Outer circumference} = 2\pi R$$

$$= (2 \times 227 \times 84) \text{ m} = 528 \text{ m}$$

$$\text{Rate of fencing} = \text{Rs. } 5 \text{ per meter}$$

$$\text{Total cost of fencing} = \text{Rs. } (528 \times 5) = \text{Rs. } 2640$$

$$\text{Area of circular ring} = \pi R^2 - \pi r^2$$

$$= \pi (84^2 - 70^2) = \frac{22}{7} \times 2156 = 6776 \text{ m}^2$$

$$\text{Cost of levelling} = \text{Rs } 0.25 \text{ per m}^2$$

$$\text{Cost of levelling the track} = \text{Rs}(6776 \times 0.25) = \text{Rs. } 1694$$

Question 14:

Let r m and R m be the radii of inner circle and outer boundaries respectively.

$$\text{Then, } 2r = 352 \text{ and } 2R = 396$$

$$r = \frac{352}{2\pi}, R = \frac{396}{2\pi}$$

$$\text{Width of the track} = (R - r) \text{ m}$$

$$= \left(\frac{396}{2\pi} - \frac{352}{2\pi} \right) \text{ m} = \left(\frac{44}{2\pi} \right) \text{ m}$$

$$= \left(\frac{44}{2} \times \frac{7}{22} \right) \text{ m} = 7 \text{ m}$$

$$\text{Area the track} = \pi(R^2 - r^2) = \pi (R+r)(R-r)$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned} &= \left[\pi \left(\frac{352}{2\pi} + \frac{396}{2\pi} \right) \times 7 \right] \text{m}^2 \\ &= \left[\left(\pi \times \frac{748}{2\pi} \right) \times 7 \right] \text{m}^2 = (374 \times 7) \text{m}^2 \\ &= 2618 \text{ m}^2 \end{aligned}$$

Question 15:

Area of rectangle = (120×90)

$$= 10800 \text{ m}^2$$

Area of circular lawn = [Area of rectangle – Area of park excluding circular lawn]

$$= [10800 - 2950] \text{ m}^2 = 7850 \text{ m}^2$$

Area of circular lawn = 7850 m^2

$$\Rightarrow \pi r^2 = 7850 \text{ m}^2$$

$$3.14 \times r^2 = 7850 \text{ m}^2$$

$$r^2 = \left(\frac{7850}{3.14} \right) \text{m}^2$$

$$= 2500 \text{ m}^2$$

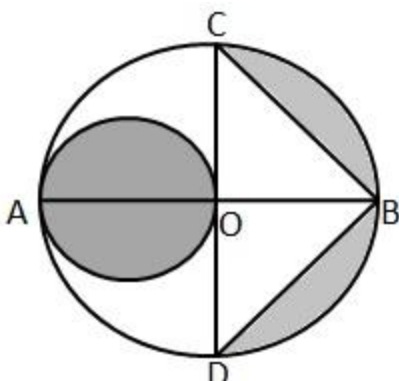
$$r = \sqrt{2500} \text{ m}$$

$$\text{or } r = 50 \text{ m}$$

Hence, radius of the circular lawn = 50 m

Question 16:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



Area of the shaded region = (area of circle with OA as diameter) + (area of semicircle ΔDBC) – (area of ΔBCD)

Area of circle with OA as diameter = πr^2

$$= \left(\frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \right) \text{cm}^2$$

$$= 38.5 \text{ m}^2$$

OB = 7 cm, CD = AB = 14 cm

Area of semicircle ΔDBC =

$$\frac{1}{2} \pi r^2 = \left(\frac{1}{2} \times \frac{22}{7} \times 7 \times 7 \right) \text{cm}^2$$

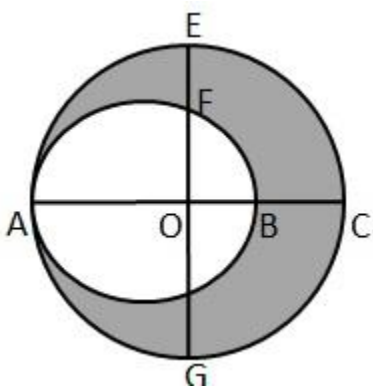
$$= 72$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned}\text{Area of } \triangle BCD &= \frac{1}{2} \times DC \times OB \\ &= \frac{1}{2} \times 14 \times 7 \\ &= 49 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of shaded region} &= (38.5 + 77 - 49) \\ &= 66.5 \text{ cm}^2\end{aligned}$$

Question 17:



Diameter of bigger circle = AC = 54 cm

Radius of bigger circle = $\frac{AC}{2}$

$$= \frac{54}{2} \text{ cm} = 27 \text{ cm}$$

Diameter AB of smaller circle = AC - BC = 54 - 10 = 44 cm

Radius of smaller circle = $\frac{44}{2} \text{ cm} = 22 \text{ cm}$

Area of bigger circle = $\pi R^2 = (22 \times 27 \times 27) \text{ cm}^2$

$$= 2291.14 \text{ cm}^2$$

Area of smaller circle = $\pi r^2 = (22 \times 22 \times 22) \text{ cm}^2$

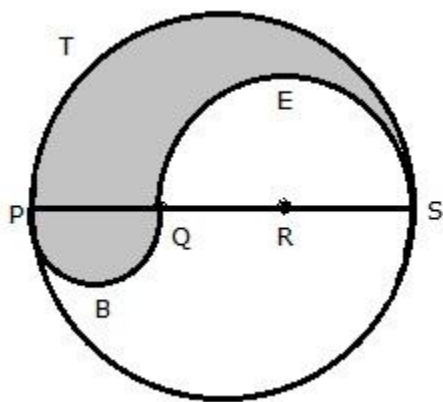
$$= 1521.11 \text{ cm}^2$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Area of shaded region = area of bigger circle – area of smaller circle

$$= (2291.14 - 1521.11) \text{ cm}^2 = 770 \text{ cm}^2$$

Question 18:



$$PS = 12 \text{ cm}$$

$$PQ = QR = RS = 4 \text{ cm}, QS = 8 \text{ cm}$$

$$\text{Perimeter} = \text{arc PTS} + \text{arc PBQ} + \text{arc QES}$$

$$= (\pi \times 6 + \pi \times 2 + \pi \times 4) \text{ cm}$$

$$= 12\pi \text{ cm}$$

$$= 12\pi = 12 \times 3.14 \text{ cm}$$

$$= 37.68 \text{ cm}$$

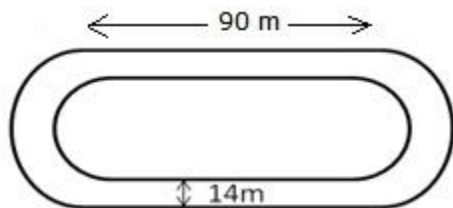
Area of shaded region = (area of the semicircle PBQ) + (area of semicircle PTS) - (Area of semicircle QES)

$$= \left[\frac{1}{2} \pi \times (2)^2 + \frac{1}{2} \times \pi \times (6)^2 - \frac{1}{2} \times \pi \times (4)^2 \right] \text{ cm}^2$$

$$= [2\pi + 18\pi - 8\pi] = 12\pi \text{ cm}^2 = (12 \times 3.14) \text{ cm}^2$$

$$= 37.68 \text{ cm}^2$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Question 19:

Length of the inner curved portion

$$= (400 - 2 \times 90) \text{ m}$$

$$= 220 \text{ m}$$

Let the radius of each inner curved part be r

$$\text{Then, } \frac{22}{7} \times r = 110 \text{ m}$$

$$r = \left(110 \times \frac{7}{22} \right) \text{ m} = 35 \text{ m}$$

$$\text{Inner radius} = 35 \text{ m, outer radius} = (35 + 14) = 49 \text{ m}$$

Area of the track = (area of 2 rectangles each $90 \text{ m} \times 14 \text{ m}$) + (area of circular ring with $R = 49 \text{ m}$, $r = 35 \text{ m}$)

$$= \left[2 \times 90 \times 14 + \frac{22}{7} \{ (49)^2 - (35)^2 \} \right] \text{ m}^2$$

$$= \left[2520 + \frac{22}{7} (49 + 35)(49 - 35) \right] \text{ m}^2$$

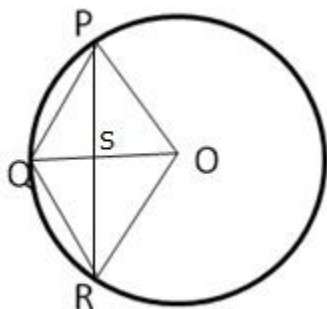
$$= [2520 + 3696] \text{ m}^2 = 6216 \text{ m}^2$$

Length of outer boundary of the track

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= \left[2 \times 90 + 2 \times \frac{22}{7} \times 49 \right] \text{m} = 488 \text{ m}$$

Question 20:



$$OP = OR = OQ = r$$

Let OQ and PR intersect at S

We know the diagonals of a rhombus bisect each other at right angle.

Therefore we have

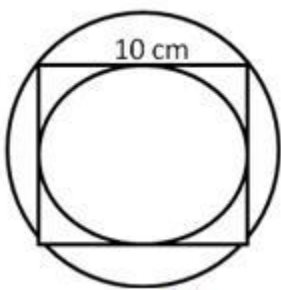
$$\begin{aligned} OS &= \frac{1}{2}r \text{ and } \angle OSR = 90^\circ \\ \therefore SR &= \sqrt{OR^2 - OS^2} \\ &= \sqrt{r^2 - \frac{r^2}{4}} = \frac{\sqrt{3}r}{2} \\ \therefore PR &= 2 \times SR = \sqrt{3}r \\ \text{Area of rhombus} &= \frac{1}{2} \times OQ \times PR \\ &= \frac{1}{2} \times r \times \sqrt{3}r = \frac{\sqrt{3}r^2}{2} \\ \therefore \frac{\sqrt{3}r^2}{2} &= 32\sqrt{3} \Rightarrow r^2 = \frac{32\sqrt{3}}{\sqrt{3}} \times 2 = 64 \text{cm} \\ r &= 8 \text{ cm} \end{aligned}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Question 21:

Diameter of the inscribed circle = Side of the square = 10 cm

Radius of the inscribed circle = 5 cm



Diameter of the circumscribed circle

= Diagonal of the square

= $(\sqrt{2} \times 10)$ cm

Radius of circumscribed circle = $5\sqrt{2}$ cm

(i) Area of inscribed circle = $(22 \times 5 \times 5) = 78.57 \text{ cm}^2$

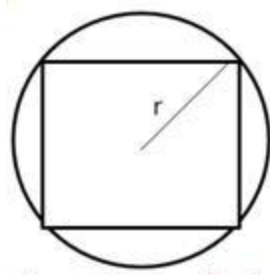
(ii) Area of the circumscribed circle

$$= \left(\frac{22}{7} \times 5\sqrt{2} \times 5\sqrt{2} \right) = 157.14 \text{ cm}^2$$

Question 22:

Let the radius of circle be r cm

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



Then diagonal of square = diameter of circle = $2r$ cm

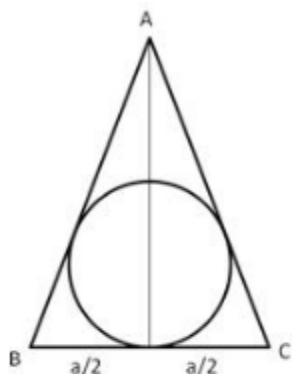
Area of the circle = πr^2 cm²

$$\begin{aligned}\text{Area of square} &= \frac{1}{2} \times (\text{diagonal})^2 \\ &= \frac{1}{2} \times 4r^2 = 2r^2 \text{ cm}\end{aligned}$$

$$\text{Ratio} = \frac{\text{Area of circle}}{\text{Area of square}} = \frac{\pi r^2}{2r^2} = \frac{\pi}{2} = (\pi : 2)$$

Question 23:

Let the radius of circle be r cm



$$\text{Then, } \pi r^2 = 154$$

$$\Rightarrow r^2 = \left(154 \times \frac{7}{22}\right)$$

$$\Rightarrow r = 7 \text{ cm}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Let each side of the triangle be a cm

And height be h cm

$$\text{Then, } r = \frac{h}{3}$$

$$\Rightarrow h = 3r = 21 \text{ cm}$$

$$h = \sqrt{a^2 - \frac{a^2}{4}} = \frac{\sqrt{3a^2}}{2} = \frac{\sqrt{3}a}{2} = 21$$

$$a = \frac{42}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 14\sqrt{3} \text{ cm}$$

$$\begin{aligned} \text{Perimeter} &= 3a = (3 \times 14 \times \sqrt{3}) = (42 \times 1.73) \text{ cm} \\ &= 72.66 \text{ cm} \end{aligned}$$

Question 24:

Radius of the wheel = 42 cm

Circumference of wheel = $2\pi r = (2 \times 227 \times 42) = 264 \text{ cm}$

Distance travelled = 19.8 km = 1980000 cm

Number of revolutions = $1980000 \div 264 = 7500$

Question 25:

Radius of wheel = 2.1 m

Circumference of wheel = $2\pi r = (2 \times 227 \times 2.1) = 13.2 \text{ m}$

Distance covered in one revolution = 13.2 m

Distance covered in 75 revolutions = $(13.2 \times 75) \text{ m} = 990 \text{ m}$

= 9901000 km

Distance a covered in 1 minute = 99100 km

Distance covered in 1 hour = $99100 \times 60 \text{ km} = 59.4 \text{ km}$

Question 26:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Distance covered by the wheel in 1 revolution

$$= \left(\frac{4.95 \times 1000 \times 100}{2500} \right) \text{cm} = 198 \text{ cm}$$

The circumference of the wheel = 198 cm

Let the diameter of the wheel be d cm

$$\begin{aligned} \text{Then, } \pi d &= 198 \Rightarrow \frac{22}{7} \times d = 198 \\ \Rightarrow d &= \frac{198 \times 7}{22} = 63 \text{ cm} \end{aligned}$$

Hence diameter of the wheel is 63 cm

Question 27:

Radius of the wheel = r = 602 = 30 cm

Circumference of the wheel = $2\pi r = (2 \times 227 \times 30) = 13207 \text{ cm}$

Distance covered in 140 revolution

$$\begin{aligned} &= \left(\frac{1320}{7} \times 140 \right) \text{cm} = (1320 \times 20) \text{cm} \\ &= 26400 \text{ cm} = \frac{26400}{100} \text{ m} = 264 \text{ m} = \frac{264}{1000} \text{ km} \end{aligned}$$

Distance covered in one hour = $2641000 \times 60 = 15.84 \text{ km}$

Question 28:

Distance covered by a wheel in 1 minute

$$= \left(\frac{72.6 \times 1000 \times 100}{60} \right) \text{cm} = 121000 \text{ cm}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Circumference of a wheel = $2\pi r = (2 \times 227 \times 70) = 440 \text{ cm}$

Number of revolution in 1 min = $121000440 = 275$

Question 29:

Area of quadrant = $14 \pi r^2$

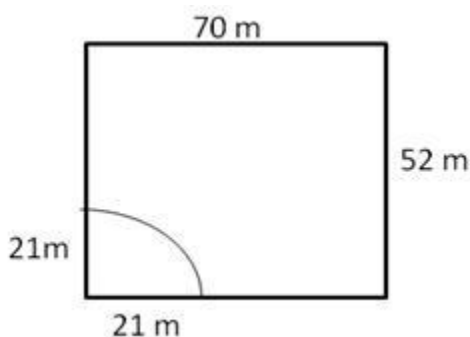
Circumference of circle = $2\pi r = 22$

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

$$\Rightarrow r = \frac{22 \times 7}{2 \times 22} = 3.5 \text{ cm}$$

$$\begin{aligned} \text{Area of quadrant} &= \frac{1}{4} \pi r^2 = \left(\frac{1}{4} \times \frac{22}{7} \times 3.5 \times 3.5 \right) \text{ cm}^2 \\ &= 9.625 \text{ cm}^2 \end{aligned}$$

Question 30:



Area which the horse can graze = Area of the quadrant of radius 21 m

$$\begin{aligned} &= \left(\frac{1}{4} \times \frac{22}{7} \times 21 \times 21 \right) \text{ m}^2 \\ &= 346.5 \text{ m}^2 \end{aligned}$$

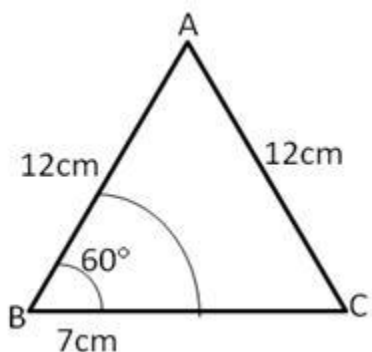
Area ungrazed = $[(70 \times 52) - 346.5] \text{ m}^2$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= 3293.5 \text{ m}^2$$

Question 31:

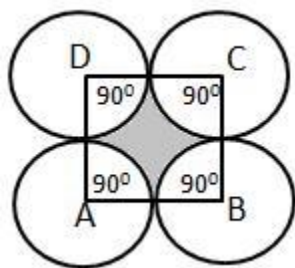
Each angle of equilateral triangle is 60°



$$\begin{aligned} \text{Area which cannot be grazed} &= (\text{area of equilateral } \triangle ABC) \\ &\quad - (\text{area of the sector with } r = 7 \text{ m}, \theta = 60^\circ) \\ &= \left[\frac{\sqrt{3}}{4} \times (12)^2 - \frac{22}{7} \times (7)^2 \times \frac{60}{360} \right] \text{ m}^2 \\ &= \left[(\sqrt{3} \times 12 \times 3) - \frac{(22 \times 7)}{6} \right] \\ &= 62.35 - 25.66 \text{ m}^2 \\ &= 36.68 \text{ m}^2 \end{aligned}$$

Area that the horse cannot graze is 36.68 m^2

Question 32:



Each side of the square is 14 cm

Then, area of square = $(14 \times 14) \text{ cm}^2$

$$= 196 \text{ cm}^2$$

Thus, radius of each circle 7 cm

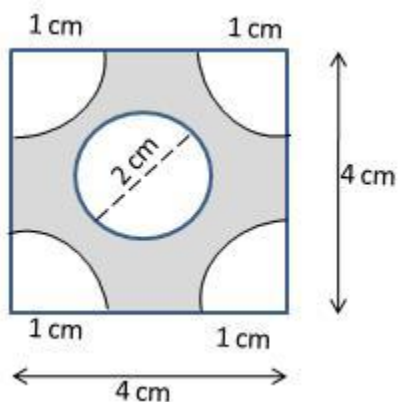
Required area = area of square ABCD – 4 (area of sector with $r = 7 \text{ cm}$, $\theta = 90^\circ$)

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned}
 &= \left[196 - 4 \times \frac{22}{7} \times 7 \times 7 \times \frac{90}{360} \right] \text{cm}^2 \\
 &= [196 - 154] \text{cm}^2 \\
 &= 42 \text{ cm}^2
 \end{aligned}$$

Area of the shaded region = 42 cm^2

Question 33:



Area of square = $(4 \times 4) \text{ cm}^2$

$$= 16 \text{ cm}^2$$

Area of four quadrant corners

$$\begin{aligned}
 &= 4 \left[\frac{1}{4} \pi r^2 \right] \\
 &= \pi r^2 \\
 &= (\pi \times 1 \times 1) \text{cm}^2 \\
 &= 3.14 \text{ cm}^2
 \end{aligned}$$

Radius of inner circle = $2/2 = 1 \text{ cm}$

Area of circle at the center = $\pi r^2 = (3.14 \times 1 \times 1) \text{ cm}^2$

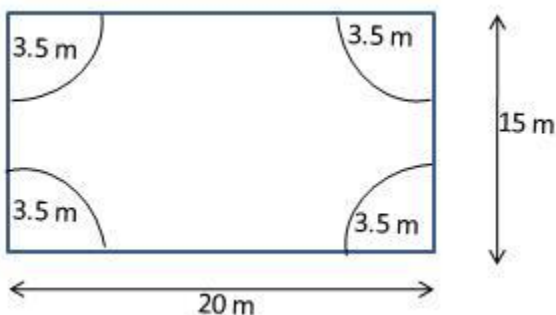
<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= 3.14 \text{ cm}^2$$

Area of shaded region = [area of square – area of four corner quadrants – area of circle at the centre]

$$= [16 - 3.14 - 3.14] \text{ cm}^2 = 9.72 \text{ cm}^2$$

Question 34:



$$\text{Area of rectangle} = (20 \times 15) \text{ m}^2 = 300 \text{ m}^2$$

Area of 4 corners as quadrants of circle

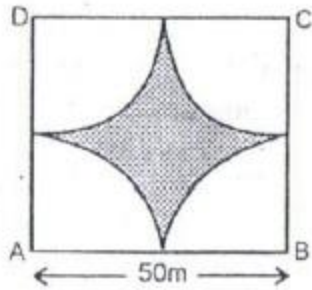
$$\begin{aligned} &= 4 \times \left(\frac{1}{4} \pi r^2 \right) \\ &= \left[\frac{22}{7} \times 3.5 \times 3.5 \right] \text{ m}^2 \\ &= 38.5 \text{ m}^2 \end{aligned}$$

Area of remaining part = (area of rectangle – area of four quadrants of circles)

$$= (300 - 38.5) \text{ m}^2 = 261.5 \text{ m}^2$$

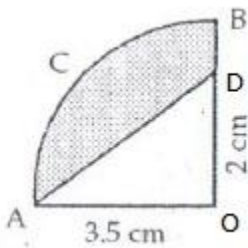
Question 35:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



Ungrazed area

Question 36:

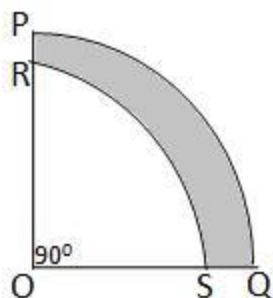


Shaded area = (area of quadrant) – (area of DAOD)

$$\begin{aligned}
 &= \left[\frac{1}{4} \pi r^2 - \frac{1}{2} \times h \times b \right] \\
 &= \left[\frac{1}{4} \times \frac{22}{7} \times 3.5 \times 3.5 - \frac{1}{2} \times 2 \times 3.5 \right] \text{cm}^2 \\
 &= (9.625 - 3.5) \text{cm}^2 = 6.125 \text{cm}^2
 \end{aligned}$$

Question 37:

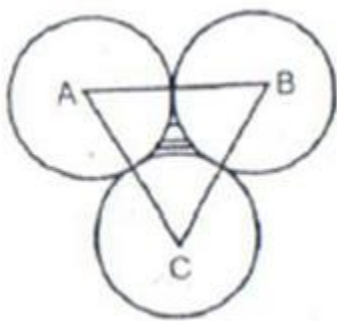
<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



Area of flower bed = (area of quadrant OPQ) – (area of the quadrant ORS)

$$\begin{aligned}
 &= \left[\frac{1}{4} \pi r_1^2 - \frac{1}{4} \pi r_2^2 \right] \\
 &= \left[\frac{1}{4} \times \frac{22}{7} \times 21 \times 21 - \frac{1}{4} \times \frac{22}{7} \times 14 \times 14 \right] \text{m}^2 \\
 &= [346.5 - 154] \text{m}^2 = 192.5 \text{ m}^2
 \end{aligned}$$

Question 38:



Let A, B, C be the centres of these circles. Join AB, BC, CA

Required area = (area of $\triangle ABC$ with each side $a = 12$ cm) – 3(area of sector with $r = 6$, $\theta = 60^\circ$)

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned}
 &= \left[\frac{\sqrt{3}}{4} \times (12)^2 - 3 \times \left(3.14 \times (6)^2 \times \frac{60}{360} \right) \right] \\
 &= \left[\frac{\sqrt{3}}{4} \times 12 \times 12 - 3 \times 3.14 \times 6 \right] \text{cm} \\
 &= (36 \times 1.73 - 56.52) \text{cm}^2 \\
 &= (62.28 - 56.52) \text{cm}^2 \\
 &= 5.76 \text{ cm}^2
 \end{aligned}$$

The area enclosed = 5.76 cm²

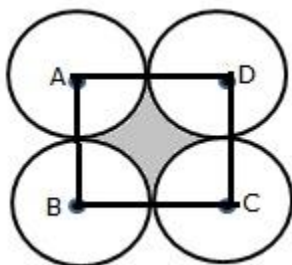
Question 39:

Let A, B, C be the centers of these circles. Join AB, BC, CA

Required area = (area of ΔABC with each side 2) – 3[area of sector with r = a cm, $\theta = 60^\circ$]

$$\begin{aligned}
 &= \left[\frac{\sqrt{3}}{4} \times (2a)^2 - \frac{3\pi a^2 \times 60}{360} \right] \\
 &= (1.73 a^2 - 1.57 a^2) \\
 &= 0.16 a^2 \\
 &= \frac{16}{100} a^2 \\
 &= \left(\frac{4}{25} a^2 \right) \text{sq. unit}
 \end{aligned}$$

Question 40:



<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Let A, B, C, D be the centres of these circles

Join AB, BC, CD and DA

Side of square = 10 cm

Area of square ABCD

$$= (10 \times 10) \text{ cm}^2$$

$$= 100 \text{ cm}^2$$

Area of each sector =

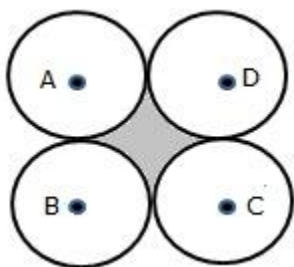
$$= 19.625 \text{ cm}^2$$

Required area = [area of sq. ABCD – 4(area of each sector)]

$$= (100 - 4 \times 19.625) \text{ cm}^2$$

$$= (100 - 78.5) = 21.5 \text{ cm}^2$$

Question 41:



Required area = [area of square – areas of quadrants of circles]

Let the side = 2a unit and radius = a units

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

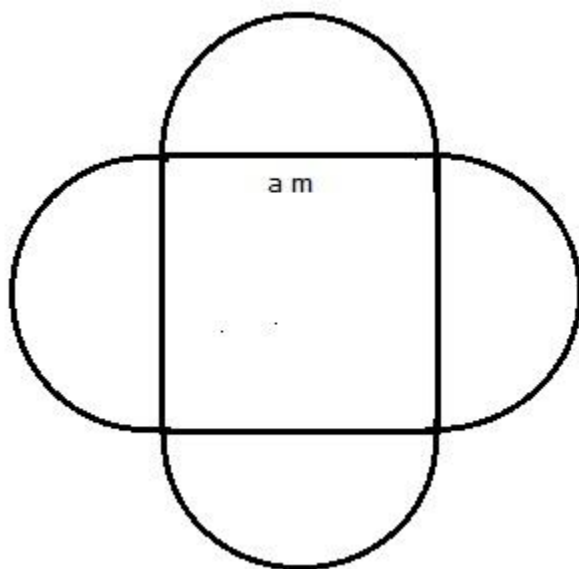
Area of square = (side $\times$ side) = $(2a \times 2a)$ sq. units = $4a^2$ sq. units

$$\text{Area of quadrant} = \frac{1}{4} \pi r^2$$

$$\text{Area of 4 quadrants} = 4 \times \frac{1}{4} \pi r^2 = \pi r^2 = \frac{22}{7} \times a \times a = \frac{22}{7} a^2 \text{ sq. unit}$$

$$\text{Required area} = \left(4a^2 - \frac{22}{7} a^2 \right) \text{ sq. unit} = \frac{6a^2}{7}$$

Question 42:



Let the side of square = a m

Area of square = $(a \times a)$ cm = a^2 m²

$$\therefore a^2 = 1600$$

$$a = \sqrt{1600} \text{ m}$$

$$a = 40 \text{ m}$$

Side of square = 40 m

Therefore, radius of semi circle = 20 m

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Area of semi circle =

$$\frac{1}{2} \pi r^2 = \left(\frac{1}{2} \times 3.14 \times 20 \times 20 \right) \text{m}^2$$

$$= 628 \text{ m}^2$$

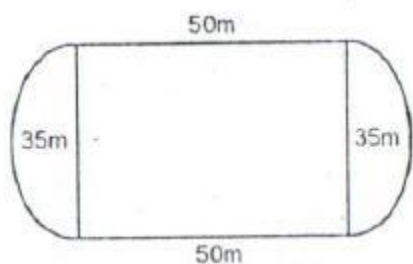
$$\text{Area of four semi circles} = (4 \times 628) \text{ m}^2 = 2512 \text{ m}^2$$

$$\text{Cost of turfing the plot of area } 1 \text{ m}^2 = \text{Rs. } 1.25$$

$$\text{Cost of turfing the plot of area } 2512 \text{ m}^2 = \text{Rs. } (1.25 \times 2512)$$

$$= \text{Rs. } 3140$$

Question 43:



Area of rectangular lawn in the middle

$$= (50 \times 35) = 1750 \text{ m}^2$$

$$\text{Radius of semi circles} = \frac{35}{2} = 17.5 \text{ m}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Area of two semicircles = 2 (area of semi circle)

$$\begin{aligned} &= \left[2 \left(\frac{1}{2} \pi r^2 \right) \right] \text{m}^2 \\ &= \left(2 \times \frac{1}{2} \times \frac{22}{7} \times 17.5 \times 17.5 \right) \text{m}^2 \\ &= 962.5 \text{ m}^2 \end{aligned}$$

Area of lawn = (area of rectangle + area of semi circle)

$$= (1750 + 962.5) \text{ m}^2 = 2712.5 \text{ m}^2$$

Question 44:

Area of plot which cow can graze when $r = 16 \text{ m}$ is πr^2

$$= (227 \times 10.5 \times 10.5)$$

$$= 804.5 \text{ m}^2$$

Area of plot which cow can graze when radius is increased to 23 m

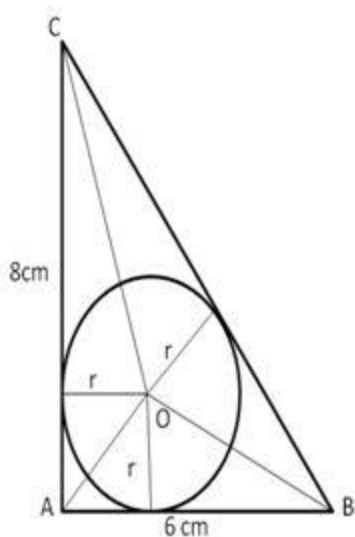
$$= (227 \times 10.5 \times 10.5)$$

$$= 1662.57 \text{ m}^2$$

Additional ground = Area covered by increased rope – old area

$$= (1662.57 - 804.5) \text{ m}^2 = 858 \text{ m}^2$$

Question 45:



Given: ABC is right angled at A with AB = 6 cm and AC = 8 cm

$$\begin{aligned} BC &= \sqrt{AB^2 + AC^2} = \sqrt{(6)^2 + (8)^2} \text{ cm} \\ &= \sqrt{36 + 64} \text{ cm} \\ BC &= \sqrt{100} \text{ cm} = 10 \text{ cm} \end{aligned}$$

Let us join OA, OB and OC

$$\text{ar}(\triangle AOC) + \text{ar}(\triangle OAB) + \text{ar}(\triangle BOC) = \text{ar}(\triangle ABC)$$

$$\begin{aligned} \Rightarrow \left(\frac{1}{2} \times 8 \times r \right) + \left(\frac{1}{2} \times 6 \times r \right) + \left(\frac{1}{2} \times 10 \times r \right) \\ = \frac{1}{2} \times 6 \times 8 \end{aligned}$$

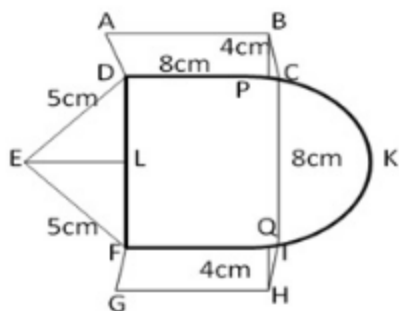
$$\begin{aligned} 4r + 3r + 5r &= 24 \\ 12r &= 24 \end{aligned}$$

$$\Rightarrow r = \frac{24}{12} = 2$$

$$\text{Radius} = 2 \text{ cm}$$

Question 46:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



Given $BP \perp CD$, $HQ \perp FI$ and $EL \perp DF$,
 $DC = 8$ cm, $BP = HQ = 4$ cm and $DE = EF = 5$ cm
 Area of parallelogram ABCD = $BP \times DC$

$$= 4 \times 8 = 32 \text{ cm}^2$$

Area of parallelogram FGHI = $FI \times HQ$

$$= 8 \times 4 = 32 \text{ cm}^2$$

Area of semicircle CKI = $\frac{1}{2} \pi r^2$

$$= \frac{1}{2} \times 3.14 \times (4)^2 = 25.12 \text{ cm}^2$$

Area of isosceles $\triangle DEF = \frac{1}{4} b \sqrt{4a^2 - b^2}$

$$= \frac{1}{4} (8) \sqrt{4(5)^2 - (8)^2} = 2\sqrt{100 - 64}$$

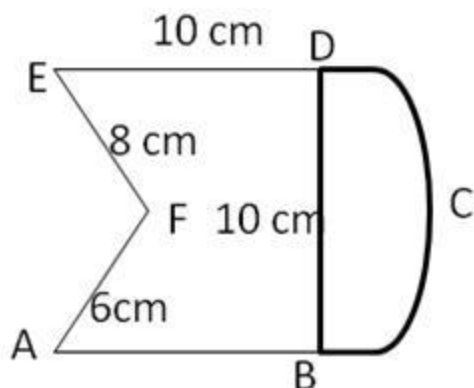
$$= 2\sqrt{36} = 12 \text{ cm}^2$$

Area of square CDFI = $(\text{side})^2 = (8)^2 = 64 \text{ cm}^2$

Area of whole figure = area of $\square$ ABCD + area of $\square$ FGHI
 + area of semi-circle CKI + area of $\triangle DEF$
 + area of square CDFI
 $= (32 + 32 + 25.12 + 12 + 64) \text{ cm}^2$
 $= 165.12 \text{ cm}^2$

Question 47:

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

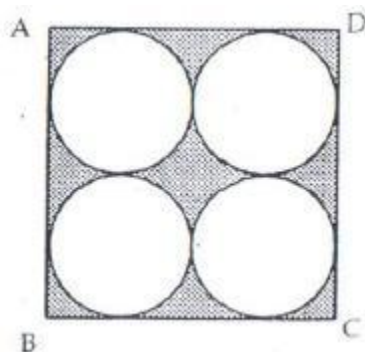


Area of region ABCDEFA = area of square ABDE + area of semi circle BCD – area of $\triangle AFE$

$$= \left[10 \times 10 + \frac{1}{2} \times 3.14 \times 5 \times 5 - \frac{1}{2} \times 10 \times 6 \right] \text{cm}^2$$

$$= [100 + 39.25 - 30] \text{cm}^2 = 109.25 \text{ cm}^2$$

Question 48:



Side of the square ABCD = 14 cm

Area of square ABCD = $14 \times 14 = 196 \text{ cm}^2$

Radius of each circle = $14 \div 2 = 3.5 \text{ cm}$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

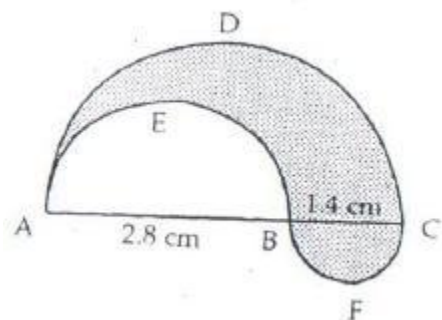
Area of the circles = $4 \times$ area of one circle

$$\begin{aligned}
 &= 4 \times \pi (3.5)^2 \\
 &= 4 \times \frac{22}{7} \times 3.5 \times 3.5 \\
 &= 154 \text{ cm}^2
 \end{aligned}$$

Area of shaded region = Area of square – area of 4 circles

$$= 196 - 154 = 42 \text{ cm}^2$$

Question 49:



Diameter AC = $2.8 + 1.4$

$$= 4.2 \text{ cm}$$

Radius $r_1 = 4.22 = 2.1 \text{ cm}$

Length of semi-circle ADC = $\pi r_1 = \pi \times 2.1 = 2.1 \pi \text{ cm}$

Diameter AB = 2.8 cm

Radius $r_2 = 1.4 \text{ cm}$

Length of semi-circle AEB = $\pi r_2 = \pi \times 1.4 = 1.4 \pi \text{ cm}$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Diameter BC = 1.4 cm

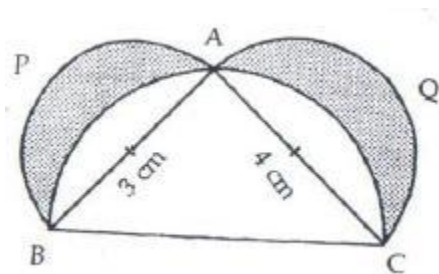
Radius $r_3 = 1.42 = 0.7$ cm

Length of semi-circle BFC = $\pi \times 0.7 = 0.7 \pi$ cm

Perimeter of shaded region = $2.1 + 1.4 + 0.7 = 4.2 \pi$ cm

= $4.2 \times 227 = 13.2$ cm

Question 50:



Area of shaded region = Area of $\triangle ABC$ + Area of semi-circle APB + Area of semi circle AQC – Area of semicircle BAC

Now, Area of a $\triangle ABC = \frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$ -- (1)

Area of semi-circle APB = $\frac{1}{2} \pi r^2 = \frac{1}{2} \pi \times \left(\frac{3}{2}\right)^2 = \frac{9}{8} \pi$ -- (2)

Area of semi-circle AQC = $\frac{1}{2} \pi r_2^2$
 $= \frac{1}{2} \pi \left(\frac{4}{2}\right)^2 = 2\pi \text{ cm}^2$ --- (3)

Further in $\triangle ABC$, $\angle A = 90^\circ$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\therefore BC^2 = AB^2 + AC^2 = 9 + 16 = 25$$

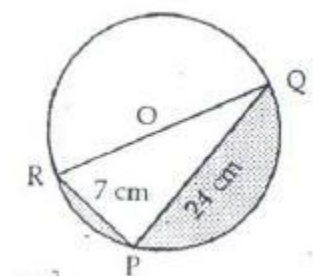
$$\therefore BC = 5$$

$$\text{Area of semi-circle BAC} = \frac{1}{2} \pi \left(\frac{5}{2}\right)^2 = \frac{25}{8} \pi \quad \dots (4)$$

Adding (1), (2), (3) and subtracting (4)

$$\begin{aligned} \therefore \text{Area of shaded region} &= 6 + \frac{9}{8} \pi + 2\pi - \frac{25}{8} \pi \\ &= 6 + \frac{25}{8} \pi - \frac{25}{8} \pi = 6 \text{ cm}^2 \end{aligned}$$

Question 51:



In ΔPQR , $\angle P = 90^\circ$, $PQ = 24 \text{ cm}$, $PR = 7 \text{ cm}$

$$\begin{aligned} \therefore QR^2 &= RP^2 + PQ^2 = 7^2 + 24^2 \\ &= 49 + 576 = 625 \end{aligned}$$

$$\therefore QR = 25 \text{ cm}$$

Area of semicircle

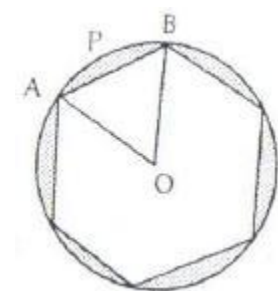
<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned}
 &= \frac{1}{2} \times \pi \times \left(\frac{25}{2}\right)^2 \\
 &= \frac{1}{2} \times 3.14 \times \frac{25 \times 25}{4} \text{ cm}^2 \\
 &= \frac{625 \times 3.14}{8} = 245.31 \text{ cm}^2
 \end{aligned}$$

$$\text{Area of } \Delta PQR = 12 \times 7 \times 24 \text{ cm}^2 = 84 \text{ cm}^2$$

$$\text{Shaded area} = 245.31 - 84 = 161.31 \text{ cm}^2$$

Question 52:



ABCDEF is a hexagon.

$$\angle AOB = 60^\circ, \text{ Radius} = 35 \text{ cm}$$

Area of sector AOB

$$\begin{aligned}
 &= \pi r^2 \times \frac{60^\circ}{360^\circ} = \frac{\pi \times 35 \times 35}{6} \text{ cm}^2 \\
 &= \frac{3.14 \times 35 \times 35}{6} \text{ cm}^2 \\
 &= 641.083 \text{ cm}^2
 \end{aligned}$$

Area of $\Delta AOB =$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\frac{\sqrt{3}}{4} \times r^2 = \frac{\sqrt{3}}{4} \times 35 \times 35 \text{ cm}^2$$

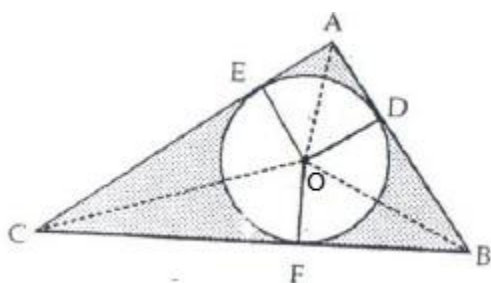
$$= 530.425 \text{ cm}^2$$

$$\text{Area of segment APB} = (641.083 - 530.425) \text{ cm}^2 = 110.658 \text{ cm}^2$$

$$\text{Area of design (shaded area)} = 6 \times 110.658 \text{ cm}^2 = 663.948 \text{ cm}^2$$

$$= 663.95 \text{ cm}^2$$

Question 53:



In $\triangle ABC$, $\angle A = 90^\circ$, $AB = 6 \text{ cm}$, $BC = 10 \text{ cm}$

$$BC^2 = AC^2 + AB^2$$

$$\therefore AC^2 = BC^2 - AB^2 = 10^2 - 6^2 = 100 - 36 = 64$$

$$\therefore AC = 8 \text{ cm}$$

Area of $\triangle ABC =$

$$\frac{1}{2} \times AC \times AB = \frac{1}{2} \times 8 \times 6 \text{ cm}^2 = 24 \text{ cm}^2$$

Let r be the radius of circle of centre O

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\text{Area of } \triangle OCB = \frac{1}{2} \times 10 \times r \text{ cm}^2 = 5r \text{ cm}^2$$

$$\text{Area of } \triangle OAB = \frac{1}{2} \times 6 \times r \text{ cm}^2 = 3r \text{ cm}^2$$

$$\text{Area of } \triangle OCA = \frac{1}{2} \times 8 \times r \text{ cm}^2 = 4r \text{ cm}^2$$

$$\text{Area of } (\triangle OCB + \triangle OAB + \triangle OCA) = \text{Area of } \triangle ABC$$

$$\therefore 5r + 3r + 4r = 24$$

$$\text{or } 12r = 24 \therefore r = 2 \text{ cm}$$

$$\therefore \text{Area of incircle} = \pi r^2 = 3.14 \times 2 \times 2 \text{ cm}^2$$

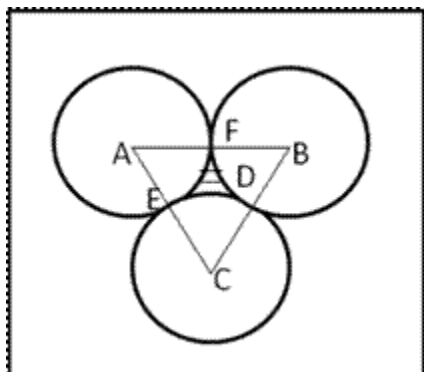
$$= 12.56 \text{ cm}^2$$

$$\Rightarrow \text{Shaded area} = \text{Area of } \triangle ABC - \text{Area of incircle}$$

$$= (24 - 12.56) \text{ cm}^2 = 11.44 \text{ cm}^2$$

Question 54:

$$\text{Area of equilateral triangle ABC} = 49\sqrt{3} \text{ cm}^2$$



Let a be its side

$$\therefore \frac{\sqrt{3}}{4} a^2 = 49\sqrt{3}$$

$$\text{or } a^2 = 49 \times 4$$

$$\therefore a = 7 \times 2$$

$$\Rightarrow a = 14 \text{ cm}$$

Area of sector BDF =

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned} &= \frac{22}{7} \times 7 \times 7 \times \frac{60}{360} \text{ cm} \\ \pi r^2 \times \frac{\theta}{360^\circ} &= \frac{11 \times 7}{3} \text{ cm}^2 = \frac{77}{3} \text{ cm}^2 \end{aligned}$$

Area of sector BDF = Area of sector CDE = Area of sector AEF

Sum of area of all the sectors

$$= 77 \times 3 \text{ cm}^2 = 77 \text{ cm}^2$$

Shaded area = Area of $\triangle ABC$ – sum of area of all sectors

$$= 49\sqrt{3} - 77 = (84.77 - 77.00) \text{ cm}^2$$

$$= 7.77 \text{ cm}^2$$

Question 55:

In $\triangle ABC$, $\angle B = 90^\circ$, $AB = 48 \text{ cm}$, $BC = 14 \text{ cm}$

$$\begin{aligned} \therefore AC^2 &= AB^2 + BC^2 = 48^2 + 14^2 \\ &= 2304 + 196 = 2500 \end{aligned}$$

$$\therefore AC = 50 \text{ cm}$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times 48 \times 14 \text{ cm}^2 = 336 \text{ cm}^2$$

Area of semi-circle APC

$$\begin{aligned} &= \frac{1}{2} \pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 25 \times 25 \text{ cm}^2 \\ &= \frac{11 \times 625}{7} \text{ cm}^2 = \frac{6875}{7} \text{ cm}^2 \\ &= 982.14 \text{ cm}^2 \end{aligned}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Area of quadrant BDC with radius 14 cm

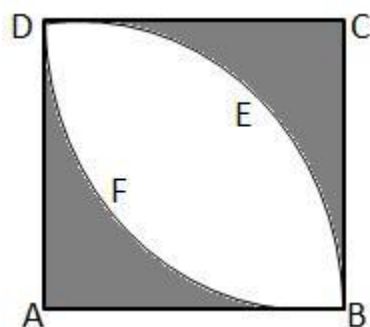
$$= \frac{1}{4} \times \frac{22}{7} \times 14 \times 14 \text{ cm}^2 = 154 \text{ cm}^2$$

Shaded area = Area of $\triangle ABC$ + Area of semi-circle APC – Area of quadrant BDC

$$= (336 + 982.14 - 154) \text{ cm}^2$$

$$= (1318.14 - 154) \text{ cm}^2 = 1164.14 \text{ cm}^2$$

Question 56:



Radius of quadrant ABED = 16 cm

Its area =

$$\frac{1}{4} \times \frac{22}{7} \times 16 \times 16 \text{ cm}^2$$

Area of $\triangle ABD = (12 \times 16 \times 16) \text{ cm}^2$

$$= 128 \text{ cm}^2$$

Area of segment DEB

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned} &= \frac{11 \times 128}{7} - 128 \\ &= 128 \left(\frac{11-7}{7} \right) \text{cm}^2 = \frac{128 \times 4}{7} \text{cm}^2 = \frac{512}{7} \text{cm}^2 \end{aligned}$$

Area of segment DFB = 5127 cm^2

Total area of segments = $2 \times 5127 \text{ cm}^2 = 10247 \text{ cm}^2$

Shaded area = Area of square ABCD – Total area of segments

$$\begin{aligned} &= \left(16 \times 16 - \frac{1024}{7} \right) \text{cm}^2 \\ &= \left(256 - \frac{1024}{7} \right) \text{cm}^2 = \frac{1792 - 1024}{7} \text{cm}^2 \\ &= \frac{768}{7} \text{cm}^2 = 109.7 \text{ cm}^2 \end{aligned}$$

Question 57:

Radius of circular table cover = 70 cm

Area of the circular cover =

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\text{In } \Delta BOD, \angle D = 90^\circ, \angle OBD = 30^\circ$$

$$\therefore \frac{BD}{OB} = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\Rightarrow BD = OB \cos 30^\circ$$

$$= 70 \times \frac{\sqrt{3}}{2} \text{ cm}$$

$$= 35\sqrt{3} \text{ cm}$$

$$\Rightarrow BC = 2BD = 2 \times 35\sqrt{3} = 70\sqrt{3}$$

$$\text{Area of } \Delta ABC = \frac{\sqrt{3}}{4} \times a^2 = \frac{\sqrt{3}}{4} \times 70\sqrt{3} \times 70\sqrt{3}$$

[$\because \Delta ABC$ is equilateral]

$$= \frac{4900 \times 3 \times \sqrt{3}}{4} \text{ cm}^2 = 1225 \times 3 \times \sqrt{3}$$

$$= 3675\sqrt{3} \text{ cm}^2 = 6365.1 \text{ cm}^2$$

$$\pi r^2 = \frac{22}{7} \times 70 \times 70 \text{ cm}^2 = 15400 \text{ cm}^2$$

Shaded area = Area of circle – Area of ΔABC

$$= (15400 - 6365.1)$$

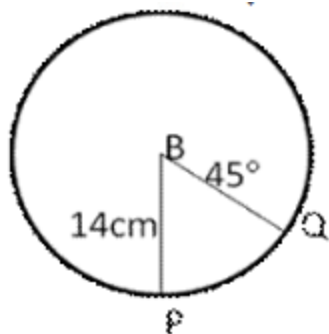
Question 58:

Area of the sector of circle =

$$\frac{\pi r^2 \theta}{360^\circ}$$

$$r = 14 \text{ cm and } \theta = 45^\circ$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>



$$\begin{aligned}\therefore \text{Area of sector} &= \left(\frac{\pi \times 14 \times 14 \times 45}{360} \right) \text{cm}^2 \\ &= (24.5\pi) \text{cm}^2 \\ &= \left(24.5 \times \frac{22}{7} \right) \text{cm}^2 = 77 \text{ cm}^2\end{aligned}$$

Question 59:

Length of the arc

$$= \frac{2\pi r\theta}{360}, r = 21 \text{ cm}, \theta = 150^\circ = \left(\frac{2\pi \times 21 \times 150}{360} \right) \text{cm} = (17.5\pi) \text{cm}$$

$$\text{Length of arc} = (17.5 \times 227) \text{ cm} = 55 \text{ cm}$$

Area of the sector =

$$\frac{\pi^2\theta}{360} = \left(\frac{\pi \times 21 \times 21 \times 150}{360} \right) \text{cm}^2$$

$$= (227 \times 183.75) \text{ cm}^2 = 577.5 \text{ cm}^2$$

Question 60:

Length of arc of circle = 44 cm

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Radius of circle = 17.5 cm

Area of sector =

$$\frac{1}{2}lr = \left(\frac{1}{2} \times 44 \times 17.5\right) \text{cm}^2$$

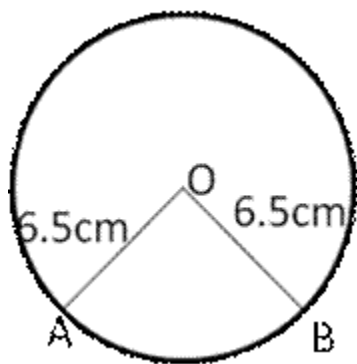
$$= (22 \times 17.5) \text{cm}^2 = 385 \text{cm}^2$$

Question 61:

Let sector of circle is OAB

Perimeter of a sector of circle = 31 cm

OA + OB + length of arc AB = 31 cm



$$6.5 + 6.5 + \text{arc AB} = 31 \text{ cm}$$

$$\text{arc AB} = 31 - 13$$

$$= 18 \text{ cm}$$

$$\begin{aligned} \text{Area of circle} &= \frac{1}{2}lr \\ &= \frac{1}{2} \times 18 \times 6.5 = 58.5 \text{ cm}^2 \end{aligned}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Question 62:

Area of the sector of circle =

$$\frac{\pi r^2 \theta}{360} = 69.3$$

Radius = 10.5 cm

$$\Rightarrow \frac{\pi \times (10.5)^2 \times \theta}{360} = 69.3$$

$$\Rightarrow \theta = \frac{69.3 \times 360 \times 7}{10.5 \times 10.5 \times 22} = 72^\circ$$

Question 63:

Length of the pendulum = radius of sector = r cm

$$\text{Arc length} = 8.8 \Rightarrow 2 \times \frac{22}{7} \times r \times \frac{30}{360} = 8.8$$

$$\Rightarrow r = \frac{8.8 \times 7 \times 360}{2 \times 22 \times 30} = 16.8 \text{ cm}$$

Question 64:

Length of arc =

$$2 \times \frac{22}{7} \times r \times \frac{54^\circ}{360^\circ} = 16.5$$

$$\frac{2\pi r \theta}{360} = 16.5 \text{ cm} \quad r = \frac{16.5 \times 7 \times 360}{2 \times 22 \times 54} = 17.5 \text{ cm}$$

Circumference of circle = $2\pi r$

$$\left(2 \times \frac{22}{7} \times 17.5 \right) = 110 \text{ cm}$$

Area of circle =

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\pi r^2 = \left(\frac{22}{7} \times 17.5 \times 17.5 \right) \text{ cm}^2$$

$$= 962.5 \text{ cm}^2$$

Question 65:

Circumference of circle = $2\pi r$

$$2\pi r = 88 \Rightarrow r = \frac{88 \times 7}{2 \times 22} = 14 \text{ cm}$$

$$\begin{aligned} \text{Area of sector} &= \frac{\pi r^2 \theta}{360} \\ &= \left(\frac{22}{7} \times 14 \times 14 \times \frac{72}{360} \right) \text{ cm}^2 = 123.2 \text{ cm}^2 \end{aligned}$$

Question 66:

Angle described by the minute hand in 60 minutes $\theta = 360^\circ$

Angle described by minute hand in 20 minutes

$$= \left(\frac{360}{60} \times 20 \right) = 120^\circ$$

Required area swept by the minute hand in 20 minutes

= Area of the sector (with $r = 15 \text{ cm}$ and $\theta = 120^\circ$)

$$\begin{aligned} &= \left(\frac{\pi r^2 \theta}{360^\circ} \right) \text{ cm}^2 = \left(3.14 \times 15 \times 15 \times \frac{120^\circ}{360^\circ} \right) \\ &= 235.5 \text{ cm}^2 \end{aligned}$$

Question 67:

$\theta = 56^\circ$ and let radius is $r \text{ cm}$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Area of sector =

$$\Rightarrow \frac{22}{7} \times r^2 \times \frac{56^\circ}{360^\circ} = 17.6$$

$$\frac{\pi r^2 \theta}{360^\circ} = 17.6 \text{ cm}^2$$

$$r^2 = \left(\frac{17.6 \times 360 \times 7}{22 \times 56} \right) \text{ cm}^2$$

$$r^2 = 36 \text{ cm}^2 \Rightarrow r = \sqrt{36} \text{ cm} = 6 \text{ cm}$$

Hence radius = 6cm

Question 68:

$$\frac{\text{Area of sector with } \theta = 150^\circ}{\text{Area of the circle}} = \frac{\pi \times (6)^2 \times \frac{150}{360}}{\pi \times (6)^2}$$

$$= \frac{150}{360} = \frac{5}{12}$$

$$\text{Required ratio} = \left(36\pi \times \frac{90}{360} \right) : \left(36\pi \times \frac{120}{360} \right) : \left(36\pi \times \frac{150}{360} \right)$$

$$= \frac{1}{4} : \frac{1}{3} : \frac{5}{12} = 3 : 4 : 5$$

Question 69:

In 2 days, the short hand will complete 4 rounds

$\therefore$ Distance travelled by its tip in 2 days

= 4(circumference of the circle with $r = 4 \text{ cm}$)

= $(4 \times 2 \times 4) \text{ cm} = 32 \text{ cm}$

In 2 days, the long hand will complete 48 rounds

$\therefore$ length moved by its tip

= 48(circumference of the circle with $r = 6 \text{ cm}$)

= $(48 \times 2 \times 6) \text{ cm} = 576 \text{ cm}$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$\therefore$ Sum of the lengths moved

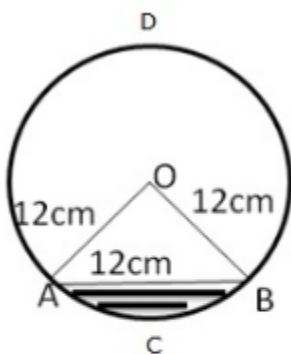
$$= (32 + 576) = 608 \text{ cm}$$

$$= (608 \times 3.14) \text{ cm} = 1909.12 \text{ cm}$$

Question 70:

$\triangle OAB$ is equilateral.

So, $\angle AOB = 60^\circ$



$$\begin{aligned} \text{arc ACB} &= \left(2\pi \times 12 \times \frac{60}{360} \right) \text{ cm} \\ &= 4\pi \text{ cm} \\ &= (4 \times 3.14) \text{ cm} \\ &= 12.56 \text{ cm} \end{aligned}$$

Length of arc BDA = $(2\pi \times 12 - \text{arc ACB}) \text{ cm}$

$$= (24\pi - 4\pi) \text{ cm} = (20\pi) \text{ cm}$$

$$= (20 \times 3.14) \text{ cm} = 62.8 \text{ cm}$$

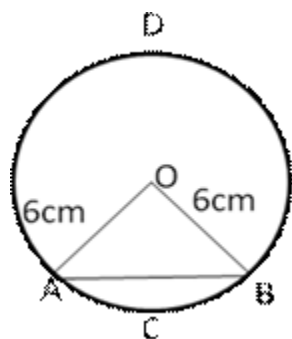
Area of the minor segment ACBA

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\begin{aligned}
 &= \left[\pi \times (12)^2 \times \frac{60}{360} - \frac{\sqrt{3}}{4} \times (12)^2 \right] \text{cm}^2 \\
 &= \left(3.14 \times 12 \times 12 \times \frac{60}{360} - \frac{1.73}{4} \times 12 \times 12 \right) \text{cm}^2 \\
 &= (75.36 - 62.28) \text{cm}^2 = 13.08 \text{ cm}^2
 \end{aligned}$$

Question 71:

Let AB be the chord of circle of centre O and radius = 6 cm such that $\angle AOB = 90^\circ$



Area of sector = OACBO

$$\begin{aligned}
 &= \frac{\pi r^2 \theta}{360} \text{ cm}^2 \\
 &= \left(\frac{22}{7} \times 6 \times 6 \times \frac{90}{360} \right) \text{ cm}^2 \\
 &= 28.29 \text{ cm}^2
 \end{aligned}$$

Area of $\triangle AOB$ =

Area of minor segment ACBA

$$= (\text{area of sector OACBO}) - (\text{area of } \triangle OAB)$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= (28.29 - 18) \text{ cm}^2 = 10.29 \text{ cm}^2$$

Area of major segment BDAB

$$= (\text{area of circle}) - (\text{area of minor segment})$$

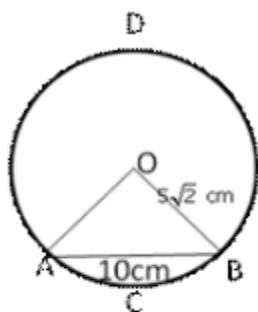
$$= \left[\left(\frac{22}{7} \times 6 \times 6 \right) - 10.29 \right] \text{ cm}^2$$

$$= (113.14 - 10.29) \text{ cm}^2 = 102.85 \text{ cm}^2$$

Question 72:

Let $OA = 5\sqrt{2} \text{ cm}$, $OB = 5\sqrt{2} \text{ cm}$

And $AB = 10 \text{ cm}$



$$\text{Then, } OA^2 + OB^2 = AB^2$$

$$\Rightarrow \angle AOB = 90^\circ$$

Area of the sector OACBO

$$= \frac{\pi r^2 \theta}{360} \text{ cm}^2$$

$$= \left(3.14 \times (5\sqrt{2}) \times (5\sqrt{2}) \times \frac{90}{360} \right) \text{ cm}^2$$

$$= 39.25 \text{ cm}^2$$

Area of $\triangle AOB =$

$$\frac{1}{2} r^2 \sin \theta = \left(\frac{1}{2} \times 5\sqrt{2} \times 5\sqrt{2} \times \sin 90^\circ \right)$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= 25 \text{ cm}^2$$

Area of minor segment = (area of sector OACBO) – (area of $\triangle OAB$)

$$= (39.25 - 25) \text{ cm}^2 = 14.25 \text{ cm}^2$$

Area of the major segment BDAB

= area of circle – area of minor segment

$$= \left(\frac{22}{7} \times 5\sqrt{2} \times 5\sqrt{2} - 14.25 \right) \text{ cm}^2$$

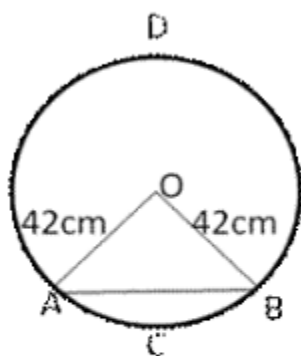
$$= \left(\frac{1100}{7} - 14.25 \right) \text{ cm}^2 = (157 - 14.25) \text{ cm}^2$$

$$= 142.75 \text{ cm}^2$$

Question 73:

Area of sector OACBO

$$= \frac{\pi r^2 \theta}{360} \text{ cm}^2 = \left(\frac{22}{7} \times 42 \times 42 \times \frac{120}{360} \right) \text{ cm}^2 = 1848 \text{ cm}^2$$



$$\text{Area of } \triangle OAB = \frac{1}{2} r^2 \sin \theta$$

$$= \left(\frac{1}{2} \times 42 \times 42 \times \sin 120^\circ \right)$$

$$= \left(21 \times 42 \times \frac{\sqrt{3}}{2} \right) \text{ cm}^2$$

$$= (21 \times 21 \times 1.73) \text{ cm}^2 = 762.93 \text{ cm}^2$$

Area of minor segment ACBA

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$= (\text{area of sector OACBO}) - (\text{area of the } \triangle OAB)$$

$$= (1848 - 762.93) \text{ cm}^2 = 1085.07 \text{ cm}^2$$

Area of major segment BADB

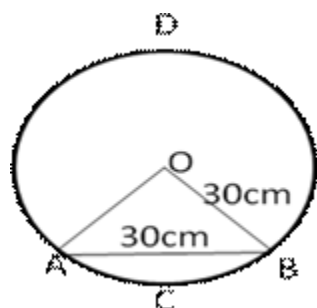
$$= (\text{area of the circle}) - (\text{area of minor segment})$$

$$= \frac{22}{7} \times 42 \times 42 - 1085.07$$

$$= (5544 - 1085.07) \text{ cm}^2 = 4458.93 \text{ cm}^2$$

Question 74:

Let AB be the chord of circle of centre O and radius = 30 cm such that $\angle AOB = 60^\circ$



Area of the sector OACBO

$$= \frac{\pi r^2 \theta}{360} \text{ cm}^2$$

$$= \left(3.14 \times 30 \times 30 \times \frac{60}{360} \right) \text{ cm}^2$$

$$= 471 \text{ cm}^2$$

Area of $\triangle OAB =$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

$$\frac{1}{2}r^2 \sin \theta = \left(\frac{1}{2} \times 30 \times 30 \times \sin 60^\circ \right) \text{cm}^2 = \left(\frac{1}{2} \times 30 \times 30 \times \frac{\sqrt{3}}{2} \right) \text{cm}^2 = (225\sqrt{3}) \text{cm}^2$$

$$= (225 \times 1.73) \text{cm}^2 = 389.25 \text{ cm}^2$$

Area of the minor segment ACBA

= (area of the sector OACBO) – (area of the Δ OAB)

$$= (471 - 389.25) \text{ cm}^2 = 81.75 \text{ cm}^2$$

Area of the major segment BADB

= (area of circle) – (area of the minor segment)

$$= [(3.14 \times 30 \times 30) - 81.75] \text{ cm}^2 = 2744.25 \text{ cm}^2$$

Question 75:

Let the major arc be x cm long

Then, length of the minor arc = 15 x cm

Circumference =

$$\frac{6x}{5} = 2 \times \frac{22}{7} \times \frac{21}{2} \Rightarrow x = 55 \text{ cm}$$

$$\text{Required area} = \left(\frac{1}{2} \times 55 \times \frac{21}{2} \right) \text{cm}^2$$

$$\left(x + \frac{1}{5}x \right) \text{cm} = \frac{6x}{5} \text{ cm} \quad \left[\text{Area} = \frac{1}{2}rl \right]$$

$$= 288.75 \text{ cm}^2$$

Question 76:

Radius of the front wheel = 40 cm = 25 m

Circumference of the front wheel =

$$\left(2\pi \times \frac{2}{5} \right) \text{m} = \frac{4\pi}{5} \text{m}$$

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Distance moved by it in 800 revolution

$$= \left(\frac{4\pi}{5} \times 800 \right) \text{ m} = (640\pi) \text{ m}$$

Circumference of rear wheel = $(2\pi \times 1) \text{ m} = (2\pi) \text{ m}$

Required number of revolutions =

$$\left(\frac{640\pi}{2\pi} \right) = 320$$



RS Aggarwal Class 10 Solutions

- Chapter 1–Real Numbers
- Chapter 2–Polynomials
- Chapter 3–Linear Equations In Two Variables
- Chapter 4–Quadratic Equations
- Chapter 5–Arithmetic Progression
- Chapter 6–Coordinate Geometry
- Chapter 7–Triangles
- Chapter 8–Circles
- Chapter 9–Constructions
- Chapter 10–Trigonometric Ratios
- Chapter 11–T Ratios Of Some Particular Angles
- Chapter 12–Trigonometric Ratios Of Some Complementary Angles
- Chapter 13–Trigonometric Identities
- Chapter 14–Height and Distance
- Chapter 15–Perimeter and Areas of Plane Figures
- Chapter 16–Areas of Circle, Sector and Segment
- Chapter 17–Volume and Surface Areas of Solids
- Chapter 18–Mean, Median, Mode of Grouped Data
- Chapter 19–Probability

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

About RS Aggarwal Class 10 Book

Investing in an R.S. Aggarwal book will never be of waste since you can use the book to prepare for various competitive exams as well. RS Aggarwal is one of the most prominent books with an endless number of problems. R.S. Aggarwal's book very neatly explains every derivation, formula, and question in a very consolidated manner. It has tonnes of examples, practice questions, and solutions even for the NCERT questions.

He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

Frequently Asked Questions (FAQs)

Why must I refer to the RS Aggarwal textbook?

RS Aggarwal is one of the most important reference books for high school grades and is recommended to every high school student. The book covers every single topic in detail. It goes in-depth and covers every single aspect of all the mathematics topics and covers both theory and problem-solving. The book is true of great help for every high school student. Solving a majority of the questions from the book can help a lot in understanding topics in detail and in a manner that is very simple to understand. Hence, as a high school student, you must definitely dwell your hands on RS Aggarwal!

Why should you refer to RS Aggarwal textbook solutions on Indcareer?

RS Aggarwal is a book that contains a few of the hardest questions of high school mathematics. Solving them and teaching students how to solve questions of such high difficulty is not the job of any neophyte. For solving such difficult questions and more importantly, teaching the problem-solving methodology to students, an expert teacher is mandatory!

Does IndCareer cover RS Aggarwal Textbook solutions for Class 6-12?

RS Aggarwal is available for grades 6 to 12 and hence our expert teachers have formulated detailed solutions for all the questions of each edition of the textbook. On our website, you'll be able to find solutions to the RS Aggarwal textbook right from Class 6 to Class 12. You can head to the website and download these solutions for free. All the solutions are available in PDF format and are free to download!

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>

About IndCareer

IndCareer.com is a leading developer of online career guidance resources for the Indian marketplace. Established in 2007, IndCareer.com is currently used by over thousands of institutions across India, including schools, employment agencies, libraries, colleges and universities.

IndCareer.com is designed to assist you in making the right career decision - a decision that meets your unique interests and personality.

For any clarifications or questions you can write to **info@indcareer.com**

Postal Address

IndCareer.com
52, Shilpa Nagar,
Somalwada
Nagpur - 440015
Maharashtra, India

WhatsApp: +91 9561 204 888

Website: <https://www.indcareer.com>

<https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-16-areas-of-circle-sector-and-segment/>