



# MATHS

## BOOKS - RD SHARMA MATHS (HINGLISH)

### AREAS RELATED TO CIRCLES

Others

1. A circular pond is on diameter 17.5m. It is surrounded by a 2m wide path. Find the cost

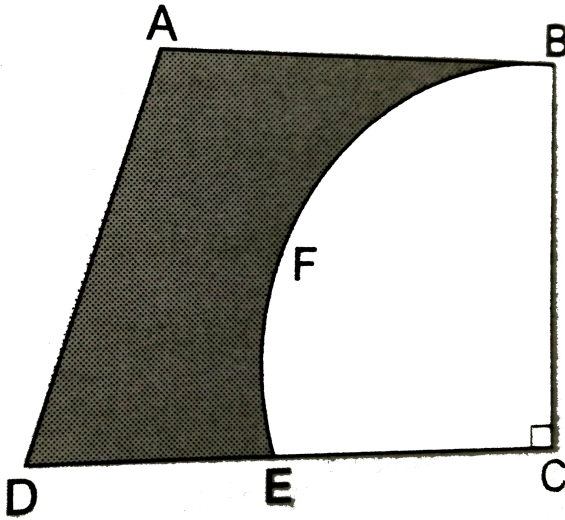
of constructing the path at the rate of Rs. 25 per square metre...



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2. From a thin metallic piece in the shaped of a trapezium  $ABCD$  in which  $AB \parallel CD$  and  $\angle BCD = 90^\circ$ , a quarter circle  $BFEC$  is removed. Given,  $AB = BC = 3.5\text{cm}$  and  $DE = 2\text{cm}$  calculate the area of remaining

(shaded) part of metal sheet.



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**3. Combination of quadrilateral and circle :** In Figure; ABCD is a trapezium with  $AB \parallel DC$  ;  $AB = 18\text{cm}$ ;  $DC = 32\text{cm}$  and the distance between AB

and DC is 14 cm. Circles of Equal radii 7 cm with centres A;B;C and D have been drawn. Then; find the area of the shaded region of the figure.



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4. In Figure, ABC is an equilateral triangle of side 8cm. A, B and C are the centres of circular arcs of radius 4cm. Find the area of the shaded region correct upto 2 decimal places.



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5. In figure, find the area of the shaded region

[Use  $\pi = 3.14$ ]



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6. Find to the three places of decimal the radius of the circle whose area is the sum of the areas of two triangles whose sides are 35, 53, 66 and 33, 56, 65 measured in centimetres.



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7. Find the area of a shaded region in the figure, where a circular arc of radius 7cm has been drawn with vertex A of an equilateral triangle ABC of side 14cm as centre.



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8. Figure, shows a kite in which BCD is the shape of a quadrant of a circle of radius 42cm. ABCD is a square and CEF is an isosceles right

angled triangle whose equal side are 6cm long. Find the area of the shaded region.



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9. A circular grassy plot of land, 42m in diameter, has a path 3.5m wide running round it on the outside. Find the cost of gravelling the path at Rs. 4 per square metre.



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**10.** From each of the two opposite corners of a square of side 8cm, a quadrant of a circle of radius 1.4 cm is cut. Another circle of diameter 4.2cm is also cut from the centre as shown in figure. Find the area of the remaining (shaded) portion of the square.



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**11.** The diagram shown two arcs, A and B. Arc A is part of the circle with centre  $O$  and radius



$OP$ . Arc  $B$  is part of the circle with centre  $M$  and radius  $PM$ , where is the mid-point of  $PQ$ .

Show that the area enclosed by the two arcs is

$$\text{equal to } 25\left(\sqrt{3} - \frac{\pi}{6}\right) \text{ cm}^2$$



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**12.** The copper wire, when bent in the form of a square, encloses an area of  $484 \text{ cm}^2$ . If the same wire is bent in the form of a circle, find the area enclosed by it.



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**13.** The inner circumference of a circular track is 220m. The track is 7m wide everywhere. Calculate the cost of putting up a fence along the outer circle at the rate of Rs. 2 per metre.

$$\left( Use \pi \frac{22}{7} \right)$$



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**14.** A boy is cycling such that the wheel of the cycle are making 140 revolutions per minute. If the diameter of the wheel is 60cm, calculate

the speed per hour with which the boy is cycling.



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**15.** The diameter of the driving wheel of a bus is 140cm. How many revolutions per minute must the wheel make in order to keep a speed of 66km per hour?



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**16.** Find the area of a quadrant of a circle whose circumference is 22cm.



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**17.** If the perimeter of a semi-circular protractor is 108cm, find the diameter of the protractor.



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**18.** Two circles touch externally. The sum of their areas is  $130 \pi \text{ sq cm}$ . and the distance between their centres is 14cm. Find the radii of the circles.



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**19.** In a circle of radius 6cm, a chord of length 10cm makes an angle of  $110^\circ$  at the centre of the circle. Find: the circumference of the circle

the area of the circle the length of the arc AB,  
the area of the sector OAB



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**20.** Figure shows a sector of a circle of radius  $r$  containing an angle  $\theta^\circ$ . The area of the sector is  $A\text{cm}^2$  and the perimeter is 50cm. Prove that

$$\theta = \frac{360}{\pi} \left( \frac{25}{r} - 1 \right) \text{ and } A = 25r - r^2$$



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21. If the equation  $x^3 + ax^2 + bx + 216 = 0$

has three roots in GP then  $b/a$  is equal to



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22. A sector of  $56^\circ$  cut out from a circle contains area  $4.4\text{cm}^2$ . Find the radius of the circle



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



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**24.** If a square is inscribed in a circle, find the ratio of the areas of the circle and the square.



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**25.** The length of the minute hand of a clock is 14cm. Find the area swept by the minute hand in 5 minutes.



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**26.** In a circle of radius 21cm, an arc subtends an angle of  $60^{\circ}$  at the centre. Find (i) the length of the arc (ii) area of the sector formed by the arc.  $\left( Use \pi \frac{22}{7} \right)$



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**27.** In an equilateral triangle of side 24cm, a circle is inscribed touching its sides. Find the area of the remaining portion of the triangle  
(Take  $\sqrt{3} = 1.732$ )



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**28.** An athletic track 14 m wide consists of two straight sections 120 m long joining and semicircular ends inner diameter 35 cm . find area



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**29.** The area of an equilateral triangle is  $49\sqrt{3}cm^2$  . Taking each angular point as shown in Figure. Find the area of the triangle not included in the circle.



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**30.** In Figure, two circular flower beds have been shown on two sides of a square lawn

ABCD of side 56m. If the centre of each circular flower bed is the point of intersection of the diagonals of the square lawn, find the sum of the areas of the lawns and the flower beds.



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**31.** ABCD is a field in the shape of a trapezium.

$AB \parallel DC$  and  $\angle ABC = 90^\circ$ ,

$\angle DAB = 60^\circ$ . Four sectors are formed with

centres  $A, B, C$  and  $D$ . The radius of each

sector is 17.5 m. Find the total area of the four sectors.



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**32.** Four equal circles, each of radius 5cm, touch each other. Find the area included between them.



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**33.** Four cows are tethered at four corners of a square plot of side 50m, so that they just cannot reach on another. What area will be left ungrazed?



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**34.** The inside perimeter of a running track (shown in figure) is 400m. The length of each of the straight portion is 90m and the ends are semi-circles. If the track is everywhere 14m

wide, find the area of the track. Also find the length of the outer running track.



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**35.** In the figure below, the square ABCD is made up of two parts, X and Y. The part X, is formed by a semicircle and line AB. The perimeter of X is 36 cm and perimeter of the shaded part Y is 64 cm. a. Find the perimeter of square ABCD b. Find the area of shaded region Y



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**36.** Figure, ABCD is a square of side  $2a$ . Find the ratio between the circumferences and the areas of the incircle and the circum-circle of the square.



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**37.** A bucket is raised from a well by means of a rope which is wound round a wheel of diameter  $77$  cm. Given that the bucket ascends



in 1 minute 28 seconds with a uniform speed of 1.1 m/sec, calculate the number of complete revolutions the wheel makes in raising the bucket.



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**38.** A chord 10 cm long is drawn in the circle whose radius is  $5\sqrt{2}$  cm. Find the area of both the segments.



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**39.** In Figure, ABC is a right-angled triangle,  $\angle B = 90^\circ$ ,  $AB = 28\text{cm}$  and  $BC = 21\text{cm}$ .

With AC as diameter a semicircle is drawn and with BC as radius a quarter circle is drawn.

Find the area of the shaded region correct to two decimal places.



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**40.** If Figure, there are three semicircles, A, B and C having diameter 3cm each, and another semicircle E having a circle D with diameter

4.5cm are shown. Calculate: the area of the shaded region. the cost of painting the shaded region at the rate of 25 paise per  $cm^2$ , to the nearest rupee.



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**41.** The inner and outer diameters of ring 1 of a dartboard are 32cm and 34cm respectively and those of rings II are 19cm and 21cm respectively. What is the total area of these two rings?



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**42.** In Figure  $AB = 36$  cm and  $M$  is mid-point of  $AB$ . Semi-circles are drawn on  $AB$ ,  $AM$  and  $MB$  as diameters. A circle with centre  $C$  touches all the three circles. Find the area of the shaded region.



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**43.** A drain cover is made from a square metal plate of side 40cm having 441 holes of

diameter 1cm each drilled in it. Find the area of the remaining square plate.



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**44.** A chord AB of a circle of radius 10cm makes a right angle at the centre of the circle. Find the area of the major and minor segments (Take  $\pi = 3.14$ ).



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**45.** A chord AB of a circle of radius 10cm subtends a right angle at the centre. Find:  
area of the minor sector  
area of the minor segment  
area of the major sector  
area of the major segment



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**46.** A pendulum swing through an angle of  $30^\circ$  and describes an arc 8.8 cm in length. Find the length of the pendulum.





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**47.** In Figure, there are shown sectors of two concentric circles of radii 7cm and 3.5cm. Find the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ).



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**48.** A car travels 1 kilometre distance in which each wheel makes 450 complete revolutions. Find the radius of the its wheels.



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**49.** In  $\triangle ABC$  with fixed length of  $BC$ , the internal bisector of angle  $C$  meets the side  $AB$  at  $D$  and meet the circumcircle at  $E$ . The maximum value of  $CD \times DE$  is



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**50.** An elastic belt is placed round the rim of a pulley of radius 5cm. One point on the belt is pulled directly away from the centre  $O$  of the



pulley until it is at P, 10cm from O. Find the length of the belt that is in contact with the rim of the pulley. Also, find the shaded area.



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51. The short and long hands of a clock are 4cm and 6cm long respectively. Find the sum of distances travelled by their tips in 2 days.

$$\left( \pi = \frac{22}{7} \right)$$



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**52.** The perimeter of a sector of a circle of radius 5.2cm is 16.4cm. Find the area of the sector.



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**53.** The length of minute hand of a clock is 14cm. Find the area swept by the minute hand in one minute.  $\left(Use\pi\frac{22}{7}\right)$



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**54.** A chord  $AB$  of a circle of radius  $10\text{cm}$  subtends a right angle at the centre. Find:  
area of the minor sector  
area of the minor segment  
area of the major sector  
area of the major segment



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**55.** In a circle with centre  $O$  and radius  $5\text{cm}$ ,  $AB$  is a chord of length  $5\sqrt{3}\text{cm}$ . Find the area of sector  $AOB$ .



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56. A horse is placed for grazing inside a rectangular field 70m by 52m and is tethered to one corner by a rope 21m long. On how much area can it graze?



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57. A paper is in the form of a rectangle  $ABCD$  in which  $AB = 20\text{cm}$  and  $BC = 14\text{cm}$ . A semi-circular portion with BC

as diameter is cut off. Find the area of a remaining part.



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