SECOND TERMINAL EVALUATION 2023-24

MATHS

Standard 1X

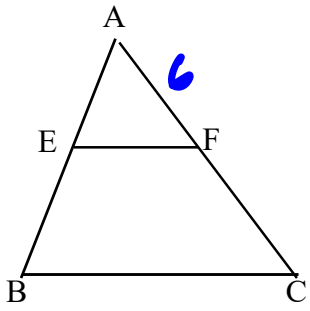
Time : 2½ hours
Total Score: 80

General Instructions to Candidates:

- The first 15 minutes is cool-off time. This time is to be spent for reading and understanding the questions.
- Answer the questions based on instructions
- Answer the questionsaccording to score and time.

Answer any three questions from 1 to 4. (Each question carries 2 score) **(3 × 2 = 6)**

1. **In the figure E is the mid point of AB.**
EF is parallel to BC.

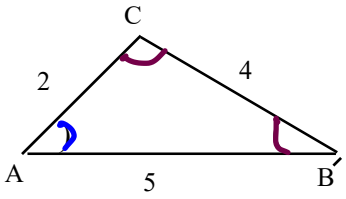


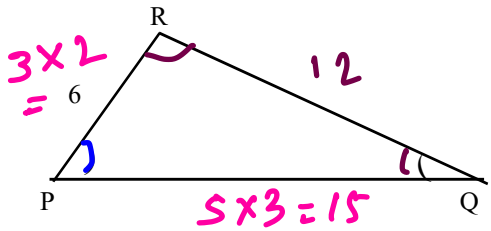
6

a) **If AC-12 centimetres, what is the length of AF ?** 6

b) **What is EF:BC?** EF : BC = 1 : 2

2. **In the figure, $\angle A = \angle P$, $\angle B = \angle Q$, AB = 5 centimetres, BC = 4 centimetres, AC = 2 centimetres, PR = 6 centimetres.**





3 x 2 = 6

a) **What is the length of PQ?** 15

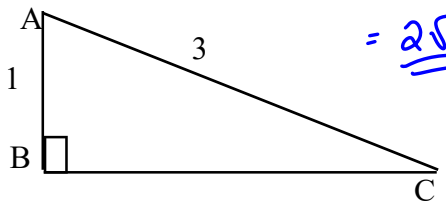
b) **What is the ratio of the perimeters of Δ ABC and Δ PQR?** 11 : 33

3. **a)** **Which among the following is a polynomial?**

(A) $x^2 + \frac{1}{x^2}$, (B) $x + \sqrt{x}$, (C) $x^2 + 2$, (D) $x + \frac{1}{x}$

b) **If P(x) = 2x + 1, find P(1).** P(1) = 2 × 1 + 1 = 2 + 1 = 3

4. **In right triangle ABC, AB = 1 centimetre,**
AC = 3 centimetres.



$3^2 - 1^2$
$= 9 - 1 = 8$
$= 2\sqrt{2}$

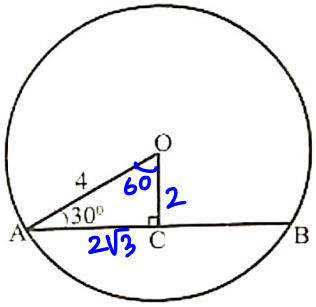
a) **What is the length of BC?** BC = $2\sqrt{2}$ cm

b) **Calculate the perimeter of Δ ABC**

P = 1 + 3 + $2\sqrt{2}$
= 4 + $2\sqrt{2}$ cm

Answer any four questions from 5 to 10. (Each question carries 3 score) **(4 × 3 = 12)**

5. In the figure, O is the centre of the circle with radius 4 centimetres and $\angle OAC = 30°$.



(a) Find ΔOAC.

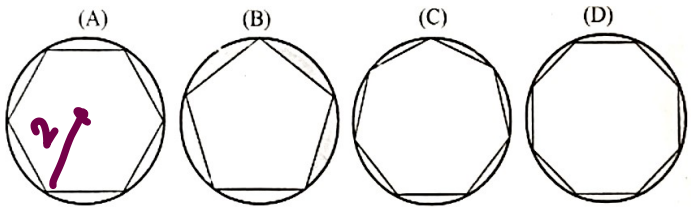
(b) What is the length of OC?

(c) Find AB.

A

6. Draw an equilateral triangle of perimeter 11 centimetres.

7. In the figure, vertices of the regular polygone are on the cirlce of same radius.



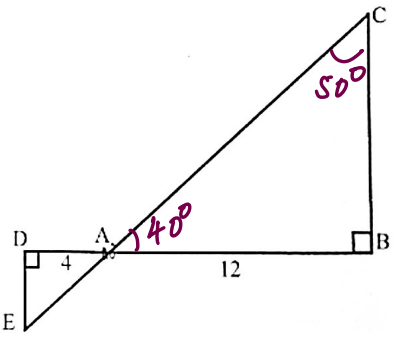
a. In which figure, area of shaded portion is maximum ?

b. If the radius of the circle in the figure is 2 centimetres, what is the area of the regular hexagon ?

8. In the figure, $\angle B = \angle D = 90°$

AB = 12 centimetres,

AD = 4 centimetres.



(a) If $\angle DAE = 40°$, Find $\angle AED$.

(b) What is the measure of $\angle C$?

(c) $\frac{BC}{DE} =$

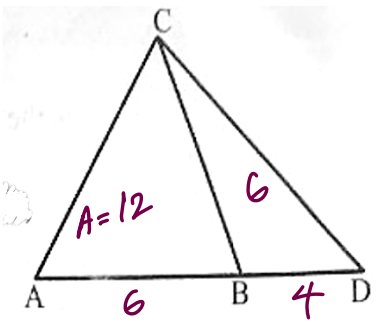
[3,4,8,12]

9. $\frac{1}{9} = 0.1111$ .... and $\frac{2}{9} = 0.2222$.....

(a) Write the fractional form of 0.3333.....

(b) Find the decimal form of $\sqrt{0.4444...} \times \sqrt{0.1111...}$

10. In the figure , AB : BD = 3 :2.

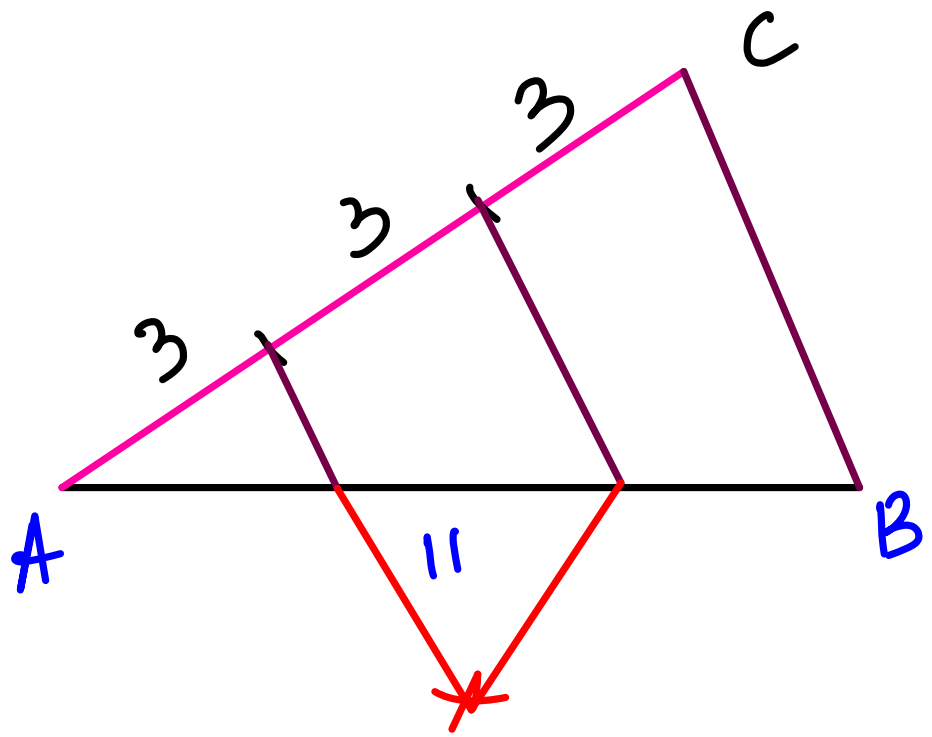


(a) If AB = 6 centimetres, find BD.

(b) If the area of the Δ ABC is 12 square centimetres,

find the area of Δ BDC and Δ ADC.

Qn-6



Answer any Eight questions from 11 to 21. (Each question carries 4score) **(8 × 4 = 32)**

11. **In the figure, O is the centre of the circle and radius is 17 centimetres.**

    AB and CD are two parallel chords.

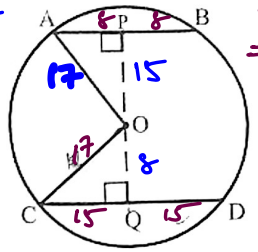
    If AB = 16 centimetres and

    CD = 30 centimetres.

    (a) **What is the length of AP.** AP = 8 cm

    (b) **What is the length of OQ.** 8

    (c) **What is the distance between the chords?** 15+8 = 23cm



$OP^2 = 17^2 - 8^2$
$= 289 - 64$
$= 225$
$OP = 15$

$17^2 - 15^2$
$= 289 - 225$
$= 64$
$= \sqrt{64}$
$= 8$

12. **Draw a rectangle of perimeter 18 centimetres and sides are in the ratio 4:3.**

13. **The general form of a first degree polynomial is ax + b, a; a ≠ 0.**

    (a) **Write the equations representing the relation P(1) = 2 and P(2)=5.**

    (b) **What is the value of a and b ?**

14. **In the figure, ABC is an isosceles triangle.**

    AB = AC = 5 centimetres.

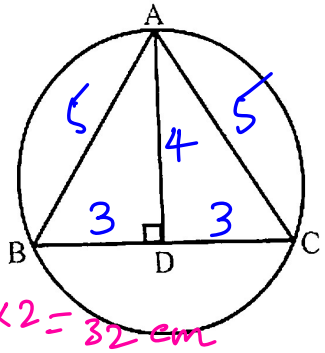
    AD = 4 centimetres.

    (a) **Find the length of BD.** BD = 3

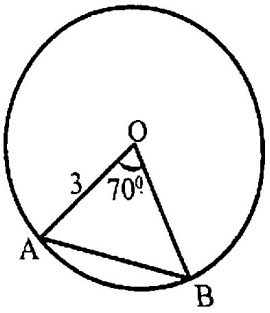
    (b) **Calculate the perimeter of △ ABC.** 6+5+5 = 16 cm

    (c) **If the circumradius is twice, find the perimeter of the triangle.** 16 × 2 = 32 cm

$5^2 - 4^2 = 25 - 16$
$= \sqrt{9} = 3$



15. **O is the centre of a circle of radius 3 centimetres. A, B are the vertices of the circle and ∠ AOB = 70°. Draw a triangle with area equal to △ ABC and all three vertices are on the circle.**



16. **The difference between two numbers is 6 and the difference between its squares is 48.**

    (a) **Form the equations indicating above statement.**

    (b) **What is the sum of the numbers ?**

    (c) **What are the numbers?**

17. **O is the centre of the circle and M is the midpoint of the chord AB.**

    ∠ CMB = 90°,

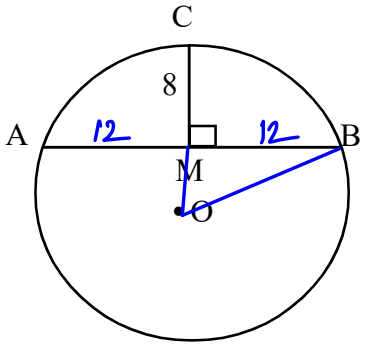
    AB = 24 centimetres,

    CM = 8 centimetres.

    (a) **AM =** 12 **centimetres**

    (b) **If 'r' is the radius of the circle,**

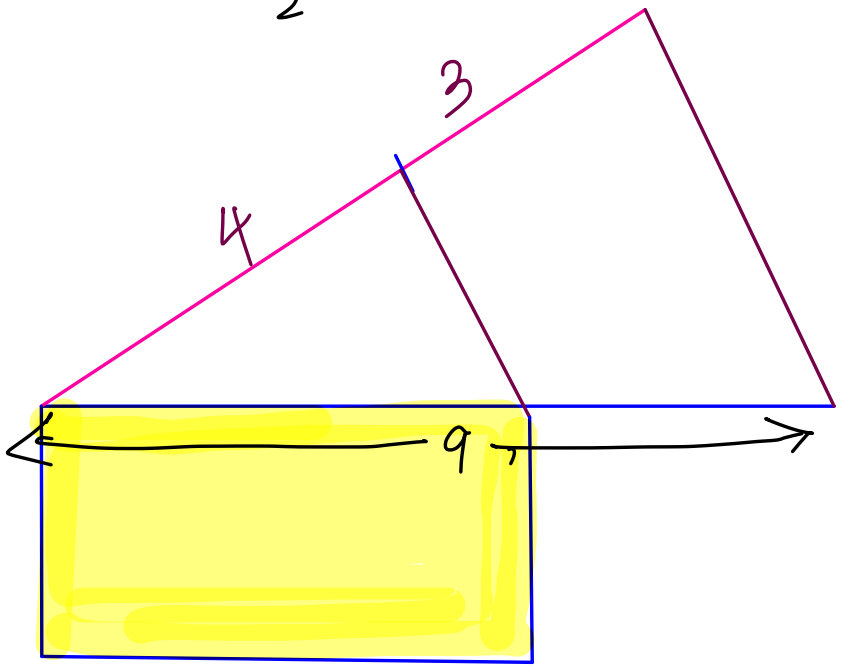
    OM = --------



Qn-12

$P = 2(l+b) = 18$

$l+b = \frac{18}{2} = 9$



Qn-13 $p(1)=2$, $p(2)=5$

a) $p(x)=ax+b$

$p(1)=ax1+b$

$a+b=2 \rightarrow (1)$

$p(2)=ax2+b$

$2a+b=5 \rightarrow (2)$

b)

$2a+b=5$

$-a+b=-2$

$a=3$

$a+b=2$

$3+b=2$

$b=2-3$

$=-1$

c) $a=3$ & $b=-1$

Qn-16

diff = 6

a) $a - b = 6$

$a^2 - b^2 = 48$

b) $a^2 - b^2 = (a-b)(a+b)$

$48 = 6(a+b)$

$a+b = \frac{48}{6}$

$a+b = 8$

c) $a+b = 8$

$a-b = 6$

$2a = 14$

$2a = 14$

$a = \frac{14}{2}$

$a = 7$

$a+b = 8$

$7+b = 8$

$b = 8-7$

$= 1$

$a = 7 \quad b = 1$

Qn-17

b) Consider $\triangle OMB$

$OB = r$ $\quad BM = 12$

$OM = OC - MC$

$= r - 8$

$OM^2 = OB^2 - BM^2$

$(r-8)^2 = r^2 - 12^2$

$r^2 - 16r + 64 = r^2 - 144$

$64 + 144 = 16r$

$16r = 208$

$r = \frac{208}{16}$

$r = 13$

$OM = 13 - 8$

$= 7$

c) $r = 13$

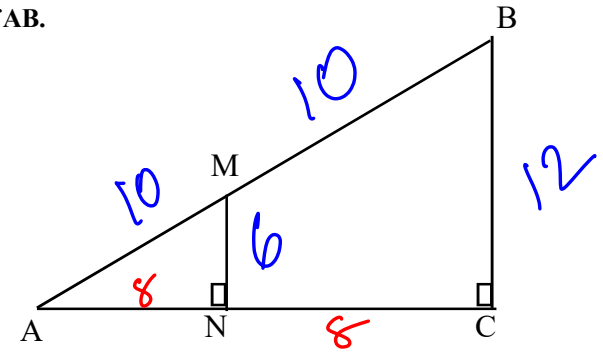
c. Find the radius of the circle.

18. In the right triangle ACB, M is the mid point of AB.

MN is the perpendicular from M to AC.

If, BC 12 centimetres and

AB= 20 centimetres

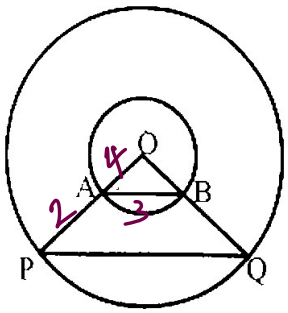


(a) What is the length of AC? AC=16

(b) What is the perimeter of the small right triangle? 10+8+6 = 24

19 In the figure, two circles are drawn with centre O. AB is the chord of small circle and PQ is that of large circle.
If OA = 4 centimetres,

OP = 6 centimetres.



(a) What is the length of PA? 2 cm

(b) OB: OQ = 4:6 = 2:3

(c) If AB = 3 centimetres,

what is the length of PQ? PQ = 4.5

$\frac{3}{PQ} = \frac{4}{6}$

$\frac{18}{4} = 4.5$

20. Length of a rectangle is 2 centimetres more than its breadth.

(a) If breadth is taken as x centimetres, what is its length?

(b) Take the perimeter as p(x), write the equation relating x and p(x).

(c) Take the area of the rectangle as a(x), write the equation relating x and a(x).

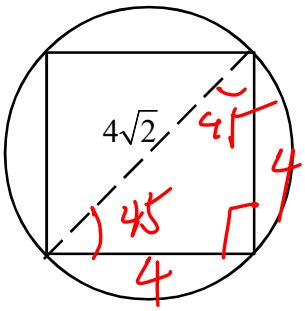
21. Four vertices of a square are on the circle. The length of the diagonal of the square is $4\sqrt{2}$ centimetres, then

(a) What is the radius of the circle?

(b) Find the area of the circle.

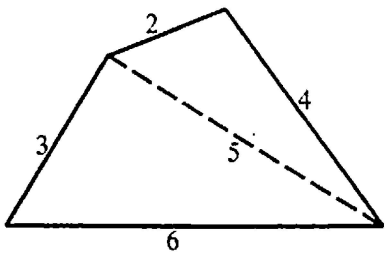
(c) If the radius of the circle is $4\sqrt{2}$ centimetres,

What is the area of the square?

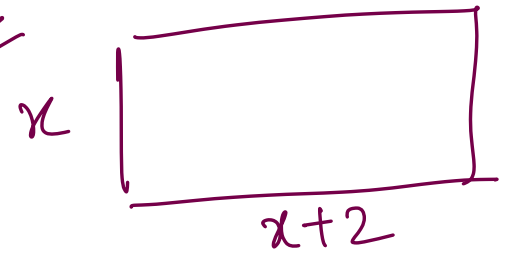


Answer any six questions from 22 to 29. (Each question carries 5 score) (6 × 5 = 30)

22. The measures given in the quadrilateral are in centimetres. Draw a quadrilateral with same angle and sides scaled by $1\frac{1}{2}$ times.



Qn-20



a) $b = x$

$l = x+2$

b) $P(x) = 2(l+b)$

$= 2(x+2+x)$

$= 2(2x+2)$

$= \underline{4x+4}$

c) $A(x) = l \times b$

$= x(x+2)$

$= \underline{x^2+2x}$

Qn-21

a) $r = \frac{4\sqrt{2}}{2}$

$= \underline{2\sqrt{2}\ cm}$

b) $A = \pi r^2 = \pi \times (2\sqrt{2})^2$

$= \underline{8\pi\ cm^2}$

c) $a = 4$ $area = 4^2$

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

Qn - 22

$1\frac{1}{2} = \frac{3}{2}$

$\frac{6 \times 3}{2} = 3 \times 3 = 9$

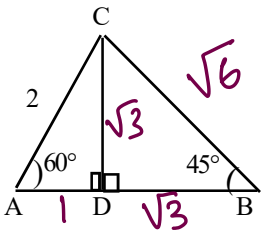
$\frac{5 \times 3}{2} = \frac{15}{2} = 7.5$

$\frac{3 \times 3}{2} = \frac{9}{2} = 4.5$

$\frac{4 \times 3}{2} = 2 \times 3 = 6$

$\frac{2 \times 3}{2} = 3$

23. In triangle ABC, AC = 2 centimetres,
CD is the perpendicular drawn from C to AB.
Also $\angle A=60°$, $\angle B=45°$.



(a) What is $\angle ACD$? 30^0

(b) What is the length of CD? $\sqrt{3}$

(c) What is the perimeter of Δ ABC? $P = 2+1+\sqrt{3}+\sqrt{6} = 3+\sqrt{3}+\sqrt{6}$

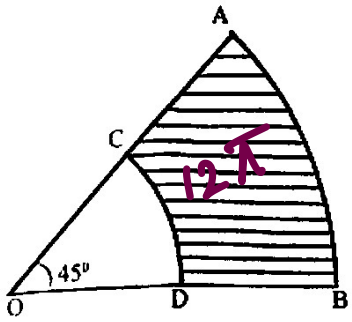
24. Consider a rectangle of perimeter 60 centímetres.

(a) What is its Length + Breadth ?

(b) If length is taken as x and its area is a(x), write an equation relating x and a(x).

(c) Find the value of a(25) and a(5) ?

25. The central angle of both the sectors are 45°.
Sum of its radii are 12 centimetres and area of the
shaded part is 12π centimetres.



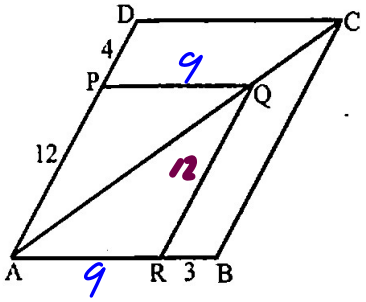
(a) If R is the radius of the large sector and r is that of small sector,
Write the equation relating sum of its radii.

(b) Find the area of sectors OAB and OCD.

(c) Find the radii of given sectors.

26. Draw a triangle of side AB = 6.5 centimetres, $\angle A = 50°$, $\angle B = 70°$. Draw its circumcirlce.

27. In the figure ABCD is a parallelogram.
PQ is parallel to AB and RQ is parallel to BC.
AP = 12 centimetres,
PD = 4 centimetres,
BR = 3 centimetres.

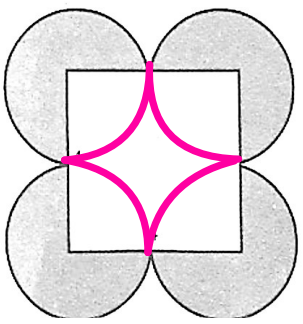


(a) What is AQ: QC? $12:4 = 3:1$

(b) AB = 12 ----------centimetres.

(c) What is the perimeter of the parallelogram APQR? $9+9+12+12 = 42\,cm$

28. Four equal sectors are fixed with centres on the vertices
of a square of side 4 centimetres is shown in the figure.



(a) What is the area of the square?

(b) What is the perimeter of the outer part?

(c) What is the area of the shaded part?

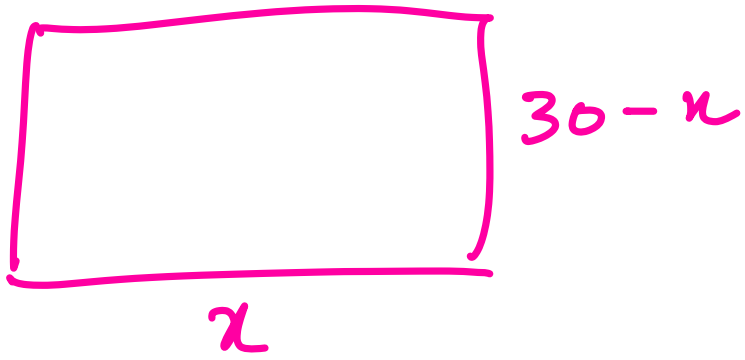
Qn-24

a) $P = 60$

$P = 2(l+b)$

$60 = 2(l+b)$

$l+b = \frac{60}{2} = 30$



b) $l = x \quad b = 30-x$

$A(x) = l \times b$

$= x(30-x)$

$= 30x - x^2$

c) $A(25) = 30 \times 25 - 25^2$

$= 750 - 625$

$= 125$

$A(5) = 30 \times 5 - 5^2$

$= 150 - 25$

$= 125$

Qn - 25

a) $R + r = 12$

b) area of sector $OAB = \frac{x}{360} \times \pi r^2$

$= \frac{45}{360} \times \pi R^2$

$= \frac{\pi R^2}{8}$

area of sector $OCD = \frac{x}{360} \times \pi r^2$

$= \frac{45}{360} \times \pi r^2$

$= \frac{\pi r^2}{8}$

c) Area of ABCD = Area of sector OAB - area of sector OCD

$$\frac{\pi R^2}{8} - \frac{\pi r^2}{8} = 12\pi$$

$$\frac{1}{8}\pi(R^2 - r^2) = 12\pi$$

$$R^2 - r^2 = \frac{12\pi \times 8}{\pi}$$

$$R^2 - r^2 = 96$$

$$R^2 - r^2 = (R+r)(R-r)$$

$$R + r = 12$$

$$(R+r)(R-r) = 96$$

$$12(R-r) = 96$$

$$R - r = \frac{96}{12} = 8$$

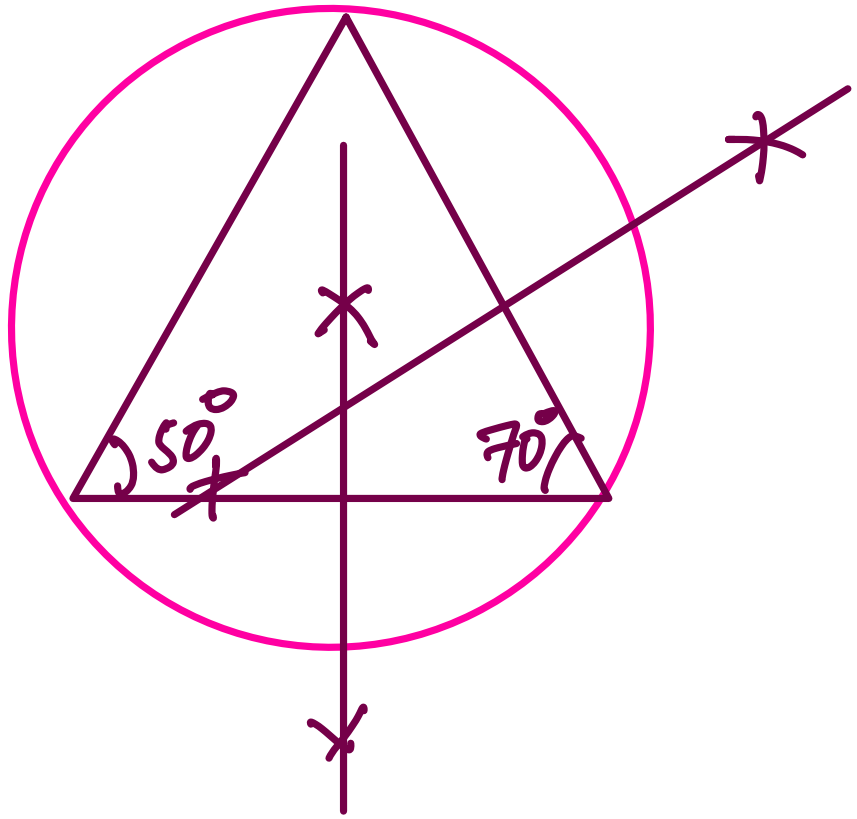
$$R + r = 12$$
$$R - r = 8$$

$$2R = 20$$

$$R = \frac{20}{2} = 10$$

$$R = 10 \qquad r = 2$$

Qn - 26



Qn = 28

a) Area of square $= 4^2 = 16\ cm^2$

b) $r = \frac{4}{2} = 2\ cm$

perimeter of one circle $= 2\pi r$
$= 2 \times \pi \times 2 = 4\pi$

perimeter of outer circle $= 4 \times 2\pi r - 4\pi$
$= 4 \times 2\pi 2 - 4\pi$
$= 16\pi - 4\pi = 12\pi$

c) Area of shaded part $= 4 \times \pi r^2 - a^2$
$= 4 \times \pi \times 2^2 - 4^2$
$= 16\pi - 16$
$= 16(\pi - 1)\ cm^2$

29. Read the pattern given below and answer the questions

$\frac{1}{2}+\frac{1}{4}=\frac{3}{4}=\frac{3}{2^2}$

$\frac{1}{4}+\frac{1}{8}=\frac{3}{8}=\frac{3}{2^3}$

$\frac{1}{8}+\frac{1}{16}=\frac{3}{16}=\frac{3}{2^4}$

.....

.....

(a) Write the next line.

(b) $\frac{1}{32}+\frac{1}{64}=--=\frac{3}{2^6}$

(c) $\frac{1}{64}+\frac{1}{128}=\frac{3}{128}=---$

(d) $\frac{3}{2^2}, \frac{3}{2^3}=\frac{3}{2^4}$ and so on , write the 10th number.

(e) Write the nth number.

a) $\frac{1}{16}+\frac{1}{32}=\frac{3}{32}=\frac{3}{25}$

b) $\frac{3}{64}$

c) $\frac{1}{2^7}$

d) $\frac{3}{2^{11}}$

e) $\frac{3}{2^{n+1}}$