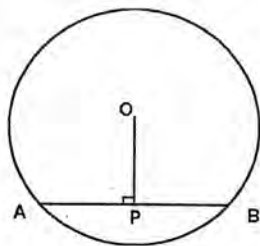


Instructions

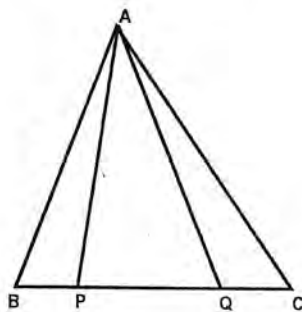
- ◆ Read the instructions carefully before answering the questions.
- ◆ Give explanations wherever necessary.
- ◆ Simplification using approximate values of $\pi, \sqrt{2}, \sqrt{3}$ need to be done only if specifically asked.
- ◆ First 15 minutes time is cool-off time.

Answer any three from questions 1 to 4. Each question carries 2 scores. ($3 \times 2 = 6$)

1. In the figure O is the centre of the circle. $OB = 5$ cm,
Distance from O to Chord AB is 3 cm. Find the length of AB.



2. In the figure $BP : PQ : QC = 1:2:1$.
Area of triangle APQ is 8 sq. cm.
(a) Find area of triangle ABP
(b) Find area of triangle ABC



3. (a) $\sqrt{7} \times \sqrt{7} =$ _____

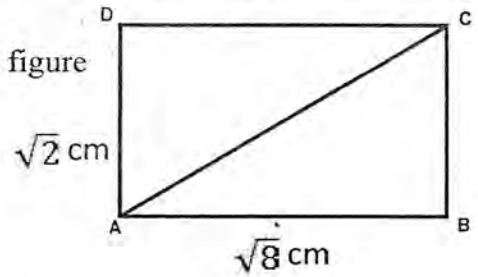
(b) $\sqrt{7} + \sqrt{7} =$ _____

4. (a) Write the decimal form of $\frac{1}{4}$

(b) Write the decimal form of $\frac{7}{10} + \frac{3}{100} + \frac{4}{1000}$

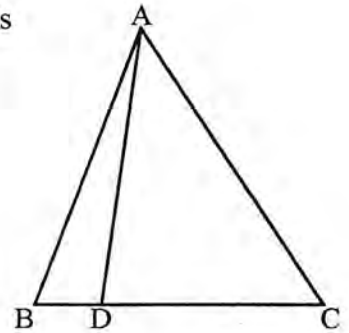
Answer any five from questions 5 to 11. Each question carries 3 scores. ($5 \times 3 = 15$)

5. (a) Find the area and perimeter of the rectangle in the figure
 (b) What is the length of AC?



6. (a) Write the decimal forms of $\frac{1}{3}$ and $\frac{1}{9}$
 (a) What is the decimal form of $(0.33333 \dots)^2$?

7. In the figure $BC = 12$ cm, $BD = 3$ cm, area of triangle ABC is 80 sq. cm.
 (a) What is $BD : DC$?
 (b) Find the area of triangle ADC.



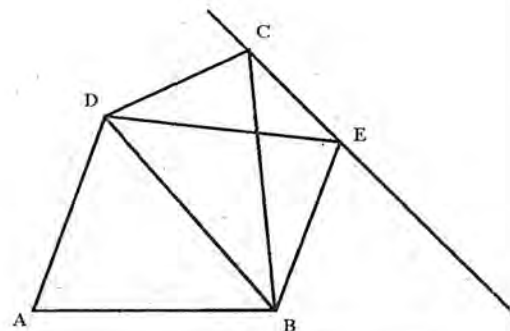
8. Sum of the digits of a two digit number is 12.
 (a) If the digits are same, write the number
 (b) If the digit at unit's place is 3 less than two times of the digit at the ten's place, find the number.

9. (a) $\frac{5}{7}$ and $\frac{10}{14}$ are equal fractions. Write a fraction equal to $\frac{5}{10}$

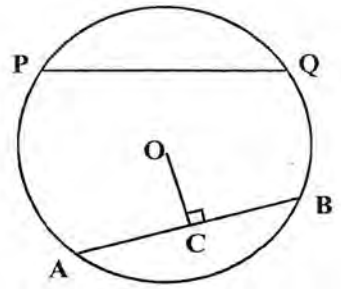
- (b) Prove that if $\frac{a}{b} = \frac{p}{q}$, then $\frac{a}{p} = \frac{b}{q}$

10. In the figure, the line CE is parallel to BD.
 Area of triangle ABD is 30 sq.cm
 and that of triangle BDC is 29 sq. cm.

- (a) What is the area of quadrilateral ABCD?
 (b) What is the area of triangle BED ?
 (c) What is the area of quadrilateral ABED?



11. In the figure, O is the centre of the circle.
AB and PQ are two chords at equal distance from the centre. AB = 12 cm, OC = 8 cm.



- (a) What is the length of PQ?
(b) Calculate the radius of the circle.

Answer any seven from questions 12 to 21. Each question carries 4 score. ($7 \times 4 = 28$)

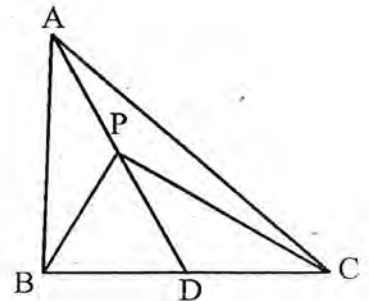
12. $\frac{1+1}{1 \times 2} = 1$

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

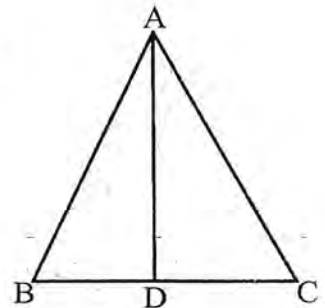
$\frac{3+9}{3 \times 4} = 1$

$\frac{4+16}{4 \times 5} = 1$

- (a) Write the next line of this pattern.
(b) Explain the general principle using algebra.
13. In the figure $BD = DC$, $PA = PD$. Area of triangle ABC is 100 sq. cm.



- (a) What is the area of triangle PAB?
(b) Find the area of triangle PBC.
(c) Draw a triangle and divide it into four triangles of equal area.
14. ABC is an equilateral triangle. AD is the bisector of $\angle A$.
AD = 3 cm.
- (a) What is the measure of $\angle ADC$?
(b) Find the length of AC.
(c) Calculate the perimeter of triangle ABC.



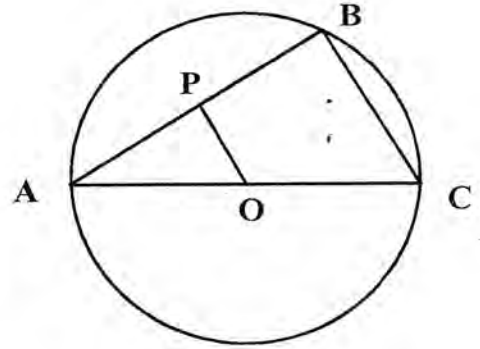
15. The sum of three times the age of son and the age of his father is 110. If three times the age of his father is added to the age of son we get 170. Then,

- (a) What is the sum of their ages?
 (b) Find their ages.

16. In the figure O is the centre of the circle.

$AB = 6$ cm and $\angle B = 90^\circ$. OP is parallel to BC.

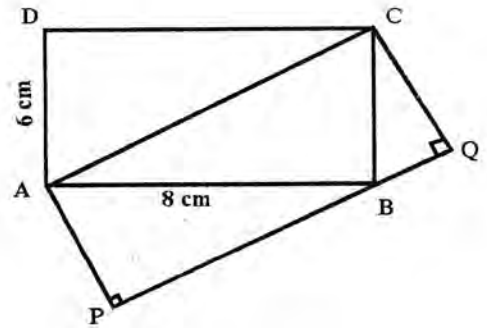
- (a) What is the measure of $\angle APO$?
 (b) Calculate length of AP.
 (c) If the diameter of the circle is 10 cm., find OP.



17. In the figure ABCD is a rectangle.

PQ is parallel to AC.

- (a) What is the area of triangle ABC?
 (b) Find the area of rectangle PQCA.
 (c) What is the length of AP?



18.(a) $\frac{1}{3} + \frac{1}{6} = \underline{\hspace{2cm}}$

(b) $\frac{1}{4} + \frac{1}{12} = \underline{\hspace{2cm}}$

(c) $\frac{1}{7} + \frac{1}{42} = \underline{\hspace{2cm}}$

(d) Write $\frac{1}{2}$ as the sum of 4 unit fractions. (fractions with numerator 1)

19. $(\sqrt{3} + \sqrt{2})(\sqrt{3} + \sqrt{2}) = (\sqrt{3})^2 + (\sqrt{2})^2 + 2\sqrt{3}\sqrt{2} = 3 + 2 + 2\sqrt{6} = 5 + 2\sqrt{6}$

Using this, find the approximate values of $\frac{1}{\sqrt{3} + \sqrt{2}}$ and $\frac{1}{\sqrt{3} - \sqrt{2}}$ correct to two decimal places. ($\sqrt{3} \approx 1.732$, $\sqrt{2} \approx 1.414$)

20.(a) Write a fraction whose sum of the numerator and the denominator is 11.

(b) Write a fraction such that if 2 is added to its numerator and denominator,

it becomes $\frac{1}{2}$

(c) Find the fraction with the above two properties.

21. Find the larger among each pair of fractions given below.

(a) $\frac{5}{6}, \frac{7}{8}$

(b) $\frac{6}{5}, \frac{8}{7}$

(c) $\frac{17}{18}, \frac{17+a}{18+a}$ (a is a natural number)

(d) $\frac{18}{17}, \frac{18+a}{17+a}$ (a is a natural number)

Answer any five from questions 22 to 28. Each question carries 5 scores ($5 \times 5 = 25$)

22. Draw triangle ABC with AB = 8 cm, BC = 6 cm, and $\angle B = 30^\circ$. Draw a right angled triangle of the same area. Measure its perpendicular sides. Calculate the area of the triangle.

23. $1 - \frac{1}{2} = \underline{\hspace{2cm}}$

$\frac{1}{2} - \frac{1}{3} = \underline{\hspace{2cm}}$

$\frac{1}{3} - \frac{1}{4} = \underline{\hspace{2cm}}$

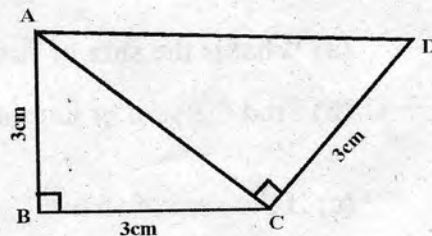
$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \dots + \frac{1}{10 \times 11} = \underline{\hspace{2cm}}$

24. In the figure $\angle B = \angle ACD = 90^\circ$

(a) What is the length of AC?

(b) Find the length of AD.

(c) How much more is the perimeter of triangle ACD than the perimeter of triangle ABC.

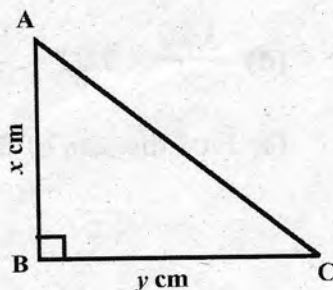


25. $\angle B = 90^\circ$, $AC = \sqrt{208}$ cm. Area of the triangle is 48 sq. cm. then,

(a) What is the value of $x^2 + y^2$?

(b) What is the value of xy ?

(c) Find x and y



26. (a) Check whether the sum and product of the numbers $\frac{7}{3}$ and $\frac{7}{4}$ are equal.

(b) Write another pair of fractions with their sum and product equal.

(c) Prove that $\frac{a+b}{a} + \frac{a+b}{b} = \frac{a+b}{a} \times \frac{a+b}{b}$

27. (a) Draw a line AB of length 4 cm. Draw a circle with AB as diameter. Mark a point 'C' on the circle. Join AC and BC

(b) What type of triangle is ABC?

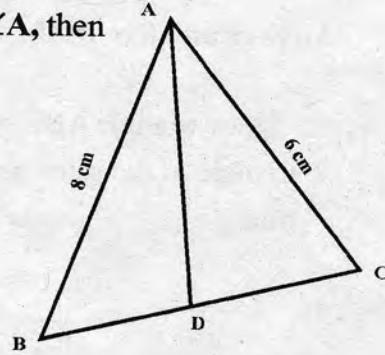
(c) Draw a right angled triangle and draw a circle passing through all its vertices.

28. If AB = 8 cm, AC = 6 cm, BC = 9 cm, AD is the bisector of $\angle A$, then

(a) **BD: DC =** _____

(b) What is the ratio of areas of triangle ABD and triangle ACD?

(c) Draw a line of length 9 cm and divide it in the ratio 3:4



Read the mathematical concept explained below and answer the questions that follow.

29. To find the sum of natural numbers from 1 to 100, the only known method was to add the numbers one by one. But Karl Frederick Gauss found an easy way. He grouped the numbers into pairs as (1,100), (2,99), (3,98) The sum of each pair is 101. How

many pairs are there? $\frac{100}{2}$ isn't it? Therefore the sum = $\frac{100}{2} \times 101$.

(a) What is the sum of first 20 natural numbers? (1)

(b) Find the sum of natural numbers from 11 to 20 (1)

(c) If the sum of first 'n' natural numbers is $\frac{99}{2} \times 100$, which number is n? (1)

(d) $\frac{100}{2} \times 101 - \frac{99}{2} \times 100 =$ _____ (1)

(e) Find the sum of first 100 even numbers (2)