(A) PROJECT (To be done on A4 size sheet)

The word **mandala** is a **Sanskrit** term that means "circle" or "discoid object". A mandala can be defined in two ways: externally as a schematic visual representation of the universe and internally as a guide for several psychophysical practices that take place in many Asian traditions, including meditation.

Mandalas include a variety of geometric shapes using patterns that have evolved from different symbols. Mandalas come in many styles and can be created using an unlimited array of materials:
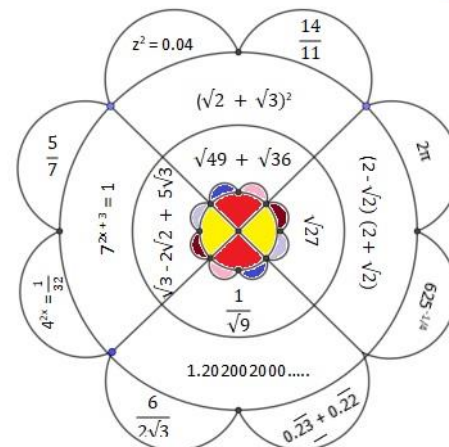
TASK 1

Draw a Mathematical Mandala Art on an A4 size sheet using few geometrical shapes example circles, semi-circles, polygons etc and colour it.

TASK 2

Make the mathematical mandala art as shown in the adjoining figure on A4 sheet. Solve the questions given in it and colour it according to the type of decimal expansion.

Note: If answer is terminating then colour the area red, if it is non-terminating repeating then colour green and if it is non-terminating non-repeating then colour blue.

$z^2 = 0.04$

$\dfrac{14}{11}$

$(\sqrt{2} + \sqrt{3})^2$

$\dfrac{5}{7}$

$\sqrt{49} + \sqrt{36}$

2π

$7^{2x+3} = 1$

$\sqrt{3 - 2\sqrt{2}} + 5\sqrt{3}$

$(2 - \sqrt{2})(2 + \sqrt{2})$

$4^{2x} = \dfrac{1}{32}$

$\sqrt{27}$

$625^{-1/4}$

$\dfrac{1}{\sqrt{9}}$

$1.20\,200\,2000\,\ldots\ldots$

$\dfrac{6}{2\sqrt{3}}$

$0.\overline{23} + 0.\overline{22}$

TASK 3

Draw any one art of your choice by using square root spiral (at-least till $\sqrt{10}$) on an A4 size sheet. Use your own creativity.

Some examples for your reference are given below.
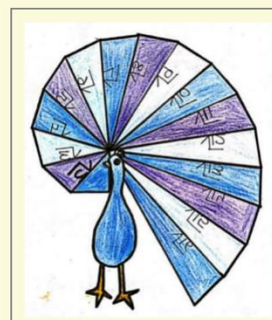
(B)ASSIGNMENT (To be done in Mathematics Register)

1. Find three rational numbers between the given rational numbers.

   (i) $\frac{1}{3}$ and $\frac{5}{4}$ (ii) $\frac{3}{7}$ and $\frac{2}{7}$ (iii) $\left(\frac{-3}{5}\right)$ and $\left(\frac{-1}{3}\right)$

2. Find three irrational numbers between the given numbers.

   (i) (-11) and (-12) (ii) $\frac{11}{4}$ and $\frac{13}{5}$ (iii) $\sqrt{2}$ and $\sqrt{3}$

3. Express the following in the form of $\frac{p}{q}$ where p, q are integers, q ≠ 0

   (i) $0.03\overline{27}$ (ii) $4.3\overline{8}$ (iii) $1.\overline{314}$

4. Simplify the following:
   (i) $(5 + \sqrt{7})(2 + \sqrt{5})$ (iii) $(2\sqrt{3} + 6\sqrt{5})(5\sqrt{2} - 3\sqrt{3})$

   (ii) $(\sqrt{11} + \sqrt{7})(\sqrt{11} - \sqrt{7})$ (iv) $(8\sqrt{2} + 3\sqrt{5})(3\sqrt{2} - 6\sqrt{3})$

5. Rationalize the denominator of the following:

   (i) $\frac{25}{\sqrt{2} + \sqrt{5}}$ (ii) $\frac{3}{\sqrt{7} - \sqrt{2}}$ (iii) $\frac{4\sqrt{3} + 3\sqrt{2}}{6\sqrt{2} - 3\sqrt{5}}$ (iv) $\frac{8}{3\sqrt{2} + 7\sqrt{3}}$

6. Simplify the following:

   (i) $\left(\frac{64}{125}\right)^{\frac{-2}{3}} + \left(\frac{625}{256}\right)^{\frac{1}{4}} + \frac{\sqrt{25}}{\sqrt[3]{64}}$

   (ii) $\sqrt{16} \times 25^{\frac{-1}{2}}$

   (iii) $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

7. Simplify:

   (i) $\frac{2\sqrt{6}}{\sqrt{3} + \sqrt{2}} + \frac{6\sqrt{2}}{\sqrt{6} + \sqrt{3}} - \frac{8\sqrt{3}}{\sqrt{6} + \sqrt{2}}$ (ii) $\frac{4 + \sqrt{5}}{4 - \sqrt{5}} + \frac{4 - \sqrt{5}}{4 + \sqrt{5}}$

   (iii) $\frac{3}{5 - \sqrt{3}} + \frac{2}{5 + \sqrt{3}}$

8. Find the value of p if,

   (i) $2^{5p} \div 2^{p} = 2^{20}$ (ii) $(27)^{p} = 9 \div 3^{p}$

9. Represent $\sqrt{10}, \sqrt{13}, and \sqrt{17}$ on the number line.

10. If a = 2 and b = 3, find the values of each of the following.

    (i) $a^{a} + b^{b}$ (ii) $a^{b} + b^{a}$ (iii) a^{b} (iv) $\left(\frac{a}{b}\right)^{a}$ (v) $\left(\frac{1}{a} + \frac{1}{b}\right)^{a}$

11. Solve for x: $4^{2x} = \frac{1}{32}$

12. If $x = 2 + \sqrt{3}$, find the value of $x^{3} + \frac{1}{x^{3}}$.

13. If $x = \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$ and $y = \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$ then find the value of $x + y + xy$.

14. Represent $\sqrt{3.5}$ and $\sqrt{9.4}$ on the number line.

15. If $x = 1 - \sqrt{2}$ then find the value of $\left(x - \dfrac{1}{x}\right)^3$

(C) Practical Activities (To be done in Mathematics practical file)

Activity 1: Corresponding angles are equal.
Activity 2: Co-interior angles are supplementary.