

Diwali maths activities for Class 9 and Class 10: answers

CBSE Math Revision · CBSE Class 9 and Class 10 · Teacher answers and notes

No calculator. Every answer works out exactly; use $\pi = 22/7$ where a question says so.

Teacher notes

- Invite students to design their own rangoli on squared paper with a stated number of lines of symmetry and order of rotational symmetry, then swap and check.
- In the diya task, cancel $3.5 = 7/2$ early: $22/7 \times 7/2 \times 7/2$ keeps every step exact.
- Tessellation links to Class 8 and 9 angle work; the last part is a good test of reasoning rather than recall.

Starter

1. **6**
 - A regular n -sided polygon has n lines of symmetry.
2. **135°**
 - Exterior angle $= 360^\circ \div 8 = 45^\circ$, so interior angle $= 180^\circ - 45^\circ = 135^\circ$.
3. **154 cm^2**
 - $22/7 \times 7 \times 7 = 154$
4. **(3, 5)**
 - Reflecting in the x -axis changes the sign of the y -coordinate.

Task A: A rangoli on a grid

- a. **All sides $2\sqrt{2}$ and both diagonals 4**
 - $AB = BC = CD = DA = \sqrt{2^2 + 2^2} = 2\sqrt{2}$.
 - Diagonals $AC = BD = 4$. Equal sides and equal diagonals, so ABCD is a square.
- b. **8 square units**
 - $(2\sqrt{2})^2 = 8$, or half the product of the diagonals: $\frac{1}{2} \times 4 \times 4 = 8$.
- c. **(-1, 3), (1, -3), (-1, -3); area 12**
 - Reflect in the y -axis: $(-1, 3)$. In the x -axis: $(1, -3)$. In both: $(-1, -3)$.
 - The rectangle is 2 wide and 6 tall: area 12.

Task B: A circular rangoli

- a. **$693/4 = 173.25 \text{ cm}^2$**
 - Whole circle: $22/7 \times 21 \times 21 = 1386 \text{ cm}^2$.
 - One sector: $1386 \div 8 = 173.25 \text{ cm}^2$.
- b. **16.5 cm**
 - Circumference: $2 \times 22/7 \times 21 = 132 \text{ cm}$. One arc: $132 \div 8 = 16.5 \text{ cm}$.
- c. **378 cm^2**
 - $42 \times 42 - 1386 = 1764 - 1386 = 378$

Task C: The diya

a. **77 cm²**

- $2 \times 22/7 \times 3.5 \times 3.5 = 77$

b. **539/6 cm³ (89⁵/₆ cm³)**

- $\frac{2}{3} \times 22/7 \times 3.5 \times 3.5 \times 3.5 = \frac{2}{3} \times 22/7 \times 343/8 = 539/6$

c. **5 diyas**

- Bottle: $22/7 \times 3.5 \times 3.5 \times 12 = 462 \text{ cm}^3$.
- $462 \div 539/6 = 2772/539 = 5$ and a bit, so 5 full diyas.

Task D: Tiles for a rangoli floor

a. **108° does not divide 360°**

- Each interior angle is 108°, and $360 \div 108 = 10/3$ is not a whole number.

b. **135° + 135° + 90° = 360°**

- Each octagon angle is 135° and the square's is 90°: $135 + 135 + 90 = 360$.

c. **$n = 12$**

- $2 \times \text{interior angle} + 60^\circ = 360^\circ$, so the interior angle is 150°.
- Exterior angle = 30°, so $n = 360 \div 30 = 12$.

Extension

1. **84 cm²**

- $s = (13 + 14 + 15)/2 = 21$.
- Area = $\sqrt{(21 \times 8 \times 7 \times 6)} = \sqrt{7056} = 84$

2. **8**

- A polygon with n sides has $n(n - 3)/2$ diagonals.
- $n(n - 3) = 40$ gives $n^2 - 3n - 40 = 0$, so $(n - 8)(n + 5) = 0$ and $n = 8$.

Every question is original and every answer was recomputed by computer before publishing.