

Pi Approximation Day puzzles for CBSE Class 9 and 10: answers

CBSE Math Revision · CBSE Class 9 and 10 · 22 July · Teacher answers and notes

No calculator. Use $\pi = 22/7$ where a question says so.

Teacher notes

- Pi Approximation Day is 22 July because $22/7$, written day first, is the famous fraction for π .
- A short set for any lesson near 22 July: each puzzle stands alone.
- Task A links to the Number system and Real numbers chapters: terminating and repeating decimals.

Starter

1. **$3 \frac{1}{7}$**
 - $22 = 3 \times 7 + 1$
2. **44 cm**
 - $22/7 \times 14 = 44$
3. **154 cm^2**
 - $22/7 \times 49 = 154$
4. **$22/7$ is rational; π is irrational**
 - $22/7$ is a ratio of integers. π cannot be written as one.

Task A: The decimal of $22/7$

- a. **142857**
 - Remainders 1, 3, 2, 6, 4, 5, then 1 again, giving digits 1, 4, 2, 8, 5, 7.
 - $22/7 = 3.142857142857\dots$
- b. **8**
 - The block 142857 has 6 digits. $100 = 6 \times 16 + 4$.
 - The 4th digit of the block is 8.
- c. **No: it is non-terminating and repeating**
 - 113 is prime and is not 2 or 5, so the denominator is not of the form $2^m 5^n$.

Task B: Rational numbers near π

- a. **$1/791$; $22/7$ is bigger**
 - $(22 \times 113 - 355 \times 7)/(7 \times 113) = (2486 - 2485)/791 = 1/791$
- b. **$377/120$**
 - $(355 + 22)/(113 + 7) = 377/120$
 - $377 \times 113 - 355 \times 120 = 42\,601 - 42\,600 = 1 > 0$, so $377/120 > 355/113$; and $22 \times 120 - 377 \times 7 = 2640 - 2639 = 1 > 0$, so $377/120 < 22/7$.
- c. **$1/497$**
 - $22/7 - 223/71 = (1562 - 1561)/497 = 1/497$

Task C: Circle puzzles

a. **14 cm; 616 cm²**

- $2 \times 22/7 \times r = 88$, so $r = 14$.
- $22/7 \times 14 \times 14 = 616$

b. **990 m**

- One turn: $22/7 \times 63 = 198$ cm.
- $500 \times 198 = 99\,000$ cm = 990 m

c. **231 cm²**

- $60/360 \times 22/7 \times 21 \times 21 = 1/6 \times 1386 = 231$

Extension

1. **The circle, by 132 cm²**

- Square: side 22, area 484.
- Circle: radius 14, area 616.
- $616 - 484 = 132$

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