

Lunar New Year maths for CBSE Class 10: answers

CBSE Math Revision · CBSE Class 10 (Class 9 can try most of it) · Teacher answers and notes

No calculator. Every answer works out exactly.

Teacher notes

- Lunar New Year falls on a different date each year: use this pack in the weeks around it.
- If students test the rule on their own birth year, remind them that the lunar year usually begins in January or February.
- Task C (b) is the textbook style of proof using Euclid's division lemma: a good model for board answers.

Starter

1. **$q = 169, r = 2$**

- $12 \times 169 = 2028$, and $2030 - 2028 = 2$.

2. **60**

- $2^2 \times 3 \times 5 = 60$

3. **36**

- $144 = 2^4 \times 3^2$, $180 = 2^2 \times 3^2 \times 5$, so $\text{HCF} = 2^2 \times 3^2 = 36$.

4. **116**

- $8 + 9 \times 12 = 116$

Task A: The 12-year cycle

a. **12**

- $2027 = 12 \times 168 + 11$, so $r = 11$ and the animal number is 12.

b. **2008, 2092; 8 terms**

- $r = 0$ means $Y = 12q + 4$: 2008, 2020, ..., 2092.
- $2092 = 2008 + (n - 1) \times 12$ gives $n = 8$.

c. **16 400**

- $S_8 = 8/2 \times (2008 + 2092) = 4 \times 4100 = 16\,400$

Task B: HCF and LCM at the festival

a. **60**

- $660 = 420 \times 1 + 240$; $420 = 240 \times 1 + 180$; $240 = 180 \times 1 + 60$; $180 = 60 \times 3 + 0$
- $\text{HCF} = 60$

b. **9 places (every 12 m)**

- $\text{LCM}(4, 6) = 12$: 0, 12, 24, ..., 96 is 9 places.

c. **12 groups of 4 dancers and 3 drummers**

- $\text{HCF}(48, 36) = 12$; $48 \div 12 = 4$ and $36 \div 12 = 3$.

Task C: Remainders

a. **27**

- 3, 15, 27, ...; $27 = 5 \times 5 + 2$.

b. Proof

- Any integer is $3q$, $3q + 1$ or $3q + 2$.
- $(3q)^2 = 3(3q^2)$; $(3q + 1)^2 = 3(3q^2 + 2q) + 1$; $(3q + 2)^2 = 3(3q^2 + 4q + 1) + 1$.
- So the square is $3m$ or $3m + 1$.

c. Colour 8

- $500 = 12 \times 41 + 8$

Extension

1. 421

- $\text{LCM}(7, 10, 12) = 420$, and $420 + 1 = 421$.

2. Proof

- Write $n = 2k + 1$. Then $n^2 - 1 = 4k^2 + 4k = 4k(k + 1)$.
- $k(k + 1)$ is a product of consecutive integers, so it is even. So $4k(k + 1)$ is a multiple of 8.

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