

# Lunar New Year maths for CBSE Class 10

CBSE Math Revision · CBSE Class 10 (Class 9 can try most of it) · Student sheet

Name \_\_\_\_\_

Class \_\_\_\_\_

Date \_\_\_\_\_

No calculator. Every answer works out exactly.

## Starter (5 minutes)

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1. Write  $2030 = 12q + r$  with  $0 \leq r < 12$ .
2. Find the LCM of 10 and 12.
3. Find the HCF of 144 and 180.
4. Find the 10th term of the AP 8, 20, 32, ...

## Main activity (35 minutes)

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### Task A: The 12-year cycle

Number the 12 animals of the cycle 1 to 12 in the traditional order (Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Goat, Monkey, Rooster, Dog, Pig). In this activity, for the lunar year that begins in calendar year  $Y$ : write  $Y - 4 = 12q + r$ ; the animal number is  $r + 1$ .

- a. Find the animal number for the lunar year that begins in 2031.
- b. The calendar years from 2001 to 2100 with animal number 1 form an AP. Find the first term, last term and number of terms.
- c. Find the sum of the years in part (b).

### Task B: HCF and LCM at the festival

Use prime factorisation or Euclid's division algorithm.

- a. Use Euclid's division algorithm to find  $\text{HCF}(420, 660)$ .
- b. Red lanterns hang every 4 m and gold lanterns every 6 m along a street, both starting at 0 m. At how many places from 0 m to 100 m are a red and a gold lantern together?
- c. 48 dancers and 36 drummers form the greatest possible number of identical groups. How many groups, and who is in each?

### Task C: Remainders

Euclid's division lemma: every integer  $a$  can be written as  $a = bq + r$ ,  $0 \leq r < b$ .

- a. Find the smallest positive number that leaves remainder 3 when divided by 12 and remainder 2 when divided by 5.
- b. Show that the square of any positive integer is of the form  $3m$  or  $3m + 1$  for some integer  $m$ .
- c. A string of beads repeats a pattern of 12 colours. Which colour (1 to 12) is the 500th bead?

### Extension

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1. Find the smallest number greater than 1 that leaves remainder 1 when divided by 7, 10 and 12.
2. Show that  $n^2 - 1$  is divisible by 8 for every odd positive integer  $n$ .