## Section 1.3  Multiples – Lowest common multiple

Multiples – are found by multiplying the number by every natural number $\{1, 2, 3, 4, 5, 6, \dots\}$

Eg) Multiples of 6

$6 \times 1$ , $6 \times 2$ , $6 \times 3$ , $6 \times 4$ , $6 \times 5$
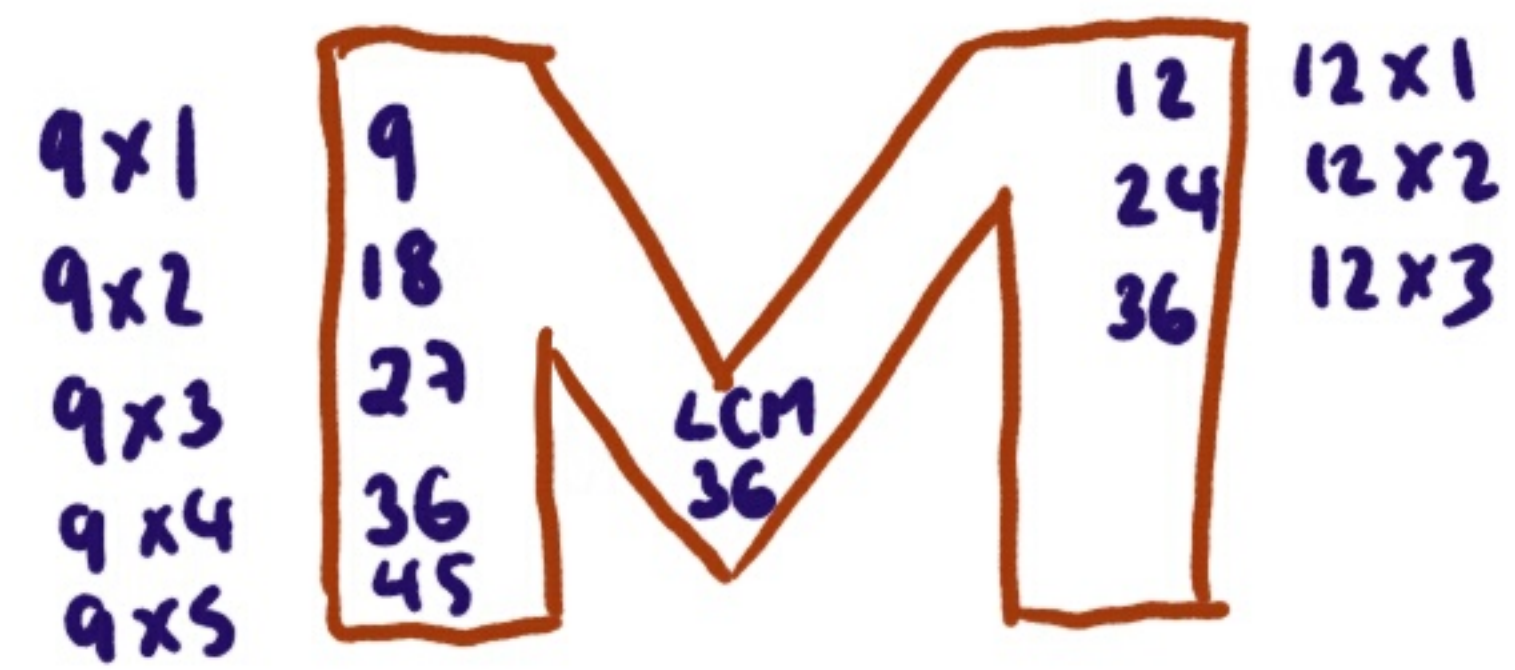
$6$ , $12$ , $18$ , $24$ , $30$

**Text & Tests 1**

**Common Introductory Course
for First-Year Maths**

Lowest Common multiple
- smallest number that is a
  multiple of 2 or more numbers

What is the LCM of 9 and 12

9 × 1   9        12   12 × 1
9 × 2   18       24   12 × 2
9 × 3   27       36   12 × 3
9 × 4   36
9 × 5   45

LCM
36

Q1) Find the LCM of 7 and 8

$7 = 7, 14, 21, 28, 35, 42, 49, \boxed{56}, 63, 70$

$8 = 8, 16, 24, 32, 40, 48, \boxed{56}, 64, 72, 80$

$LCM = 56$

**Q2)** Find the LCM of 36 and 81

Hint - use prime factorization
Multiply the highest power of
each prime, whether it is common
or not.

$36 = \boxed{2^2} \times 3^2$     $LCM = 2^2 \times 3^4$

$81 = \boxed{3^4}$     $[2][x^0][2] \times [3][x^0][4]$

$= 324.$

**Q3)** Find the LCM of 60 and 42.

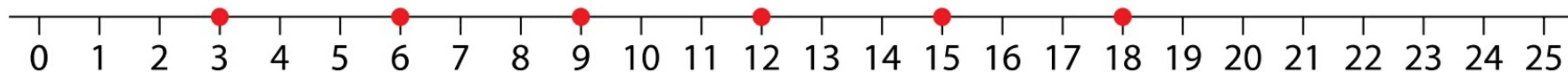$60 = 2^2 \times 3 \times 5$

$42 = 2 \times 3 \times 7$

$LCM = 2^2 \times 3 \times 5 \times 7 = 420.$

## Example 1

Find the lowest common multiple of 8, 12, 18.

**1.** The red dots on the number line show the first six multiples of 3.



(i) What is the difference between any multiple of 3 and the next multiple?

(ii) What are the next two multiples of 3 after 18?

(iii) What is the 9th multiple of 3?

(iv) What is the hundredth multiple of 3?

2.  (i)   Write out the first six multiples of 7.

  (ii)   Is 98 a multiple of 7?

 (iii)   140 is a multiple of 7. Work out the next two multiples of 7.

**3.** Write out all the multiples of 9 that are less than 80.

**4.**  (i)  Write out the first six multiples of 4.  4, 8, 12, 16, 20, 24

  (ii)  Write out the first six multiples of 6.  6, 12, 18, 24, 30, 36,

  (iii)  Which of the numbers are common multiples of 4 and 6? 12, 24

  (iv)  What is the lowest common multiple of 4 and 6?  12

**5.** Find the lowest common multiple of each of these pairs of numbers.

(i) 2, 5          (ii) 6, 8          (iii) 4, 7          (iv) 10, 12          (v) 7, 8

10               24                 28                   60

**6.** Find the LCM of each set of numbers.

   (i)  2, 4, 8        (ii)  3, 4, 6        (iii)  3, 5, 10       (iv)  6, 8, 12

      8               12              30            24

**7.** (i) The lowest common multiple of two numbers is 24.
What could these numbers be?   6 and 8.

(ii) Find three numbers whose lowest common multiple is 24.

6, 8, 4

6, 8, 3

**8.** Find three numbers whose lowest common multiple is
   (i)   36                                           (ii)   45.

**9.** Jenny is buying food for a barbecue. Burgers are sold in packs of 6 and buns are sold in packs of 8. What is the least number of packs of burgers and buns Jenny should buy so that there is one bun for each burger?

**10.** The machine below accepts two different inputs. It compares the multiples of each number and outputs the LCM.
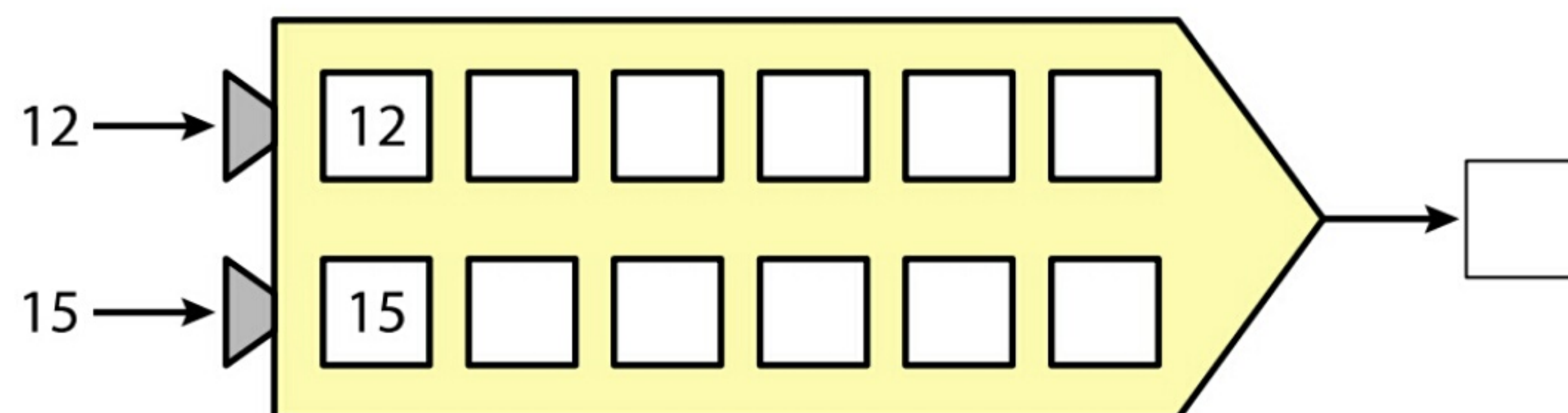


  (i)  Copy and complete this machine with inputs of 12 and 15.
 (ii)  What are the possible inputs if the output is 12?
(iii)  What are the possible inputs if the output is 42?

**11.** Describe each of the following statements as *true* or *false*.
　(i)　Any multiple of 6 is also a multiple of 3.
　(ii)　Any multiple of 5 is also a multiple of 10.
　(iii)　The LCM of 6 and 8 is 48.
　(iv)　You always get a common multiple of a pair of numbers by multiplying them together.

**12.** (i) Copy the diagram.
Write down the first nine
multiples of 9 in line 1 and the
first nine multiples of 5 in line 2.

(ii) Line 3 is the difference between
each term in lines 1 and 2, and
line 4 is the sum. Complete lines 3 and 4 and describe them in words.

(iii) Line 5 is the difference between line 4 and line 3. Describe line 5.

| line 1 | 9 | | | | | | | | 81 |
|---|---|---|---|---|---|---|---|---|---|
| line 2 | 5 | | | | | | | | 45 |
| line 3 | 4 | | | | | | | | 36 |
| line 4 | 14 | | | | | | | | 126 |

**13.** One light flashes every 25 seconds. Another light flashes every 30 seconds.

At a certain time they flash together.

How many seconds will it be before they flash together again?
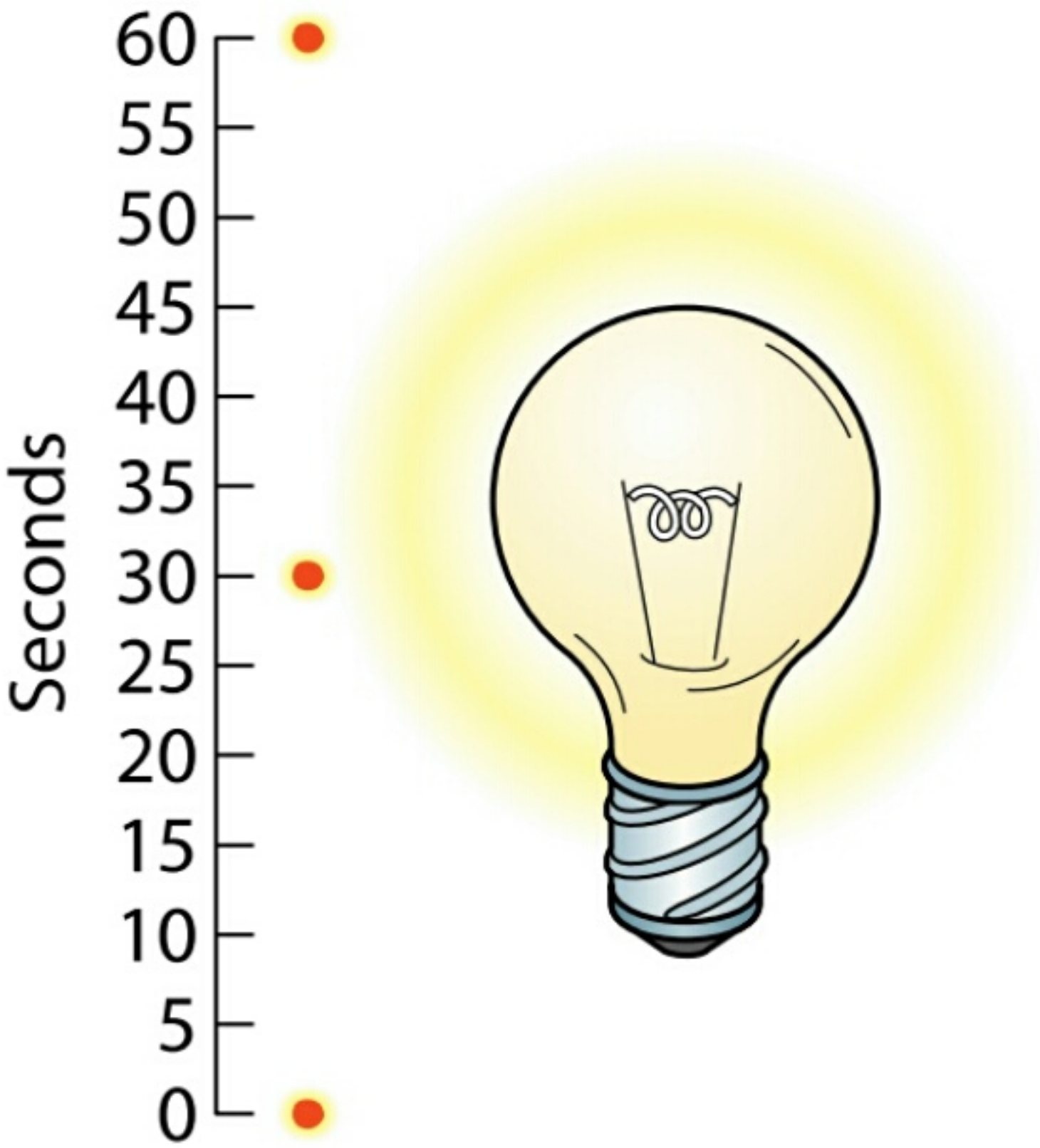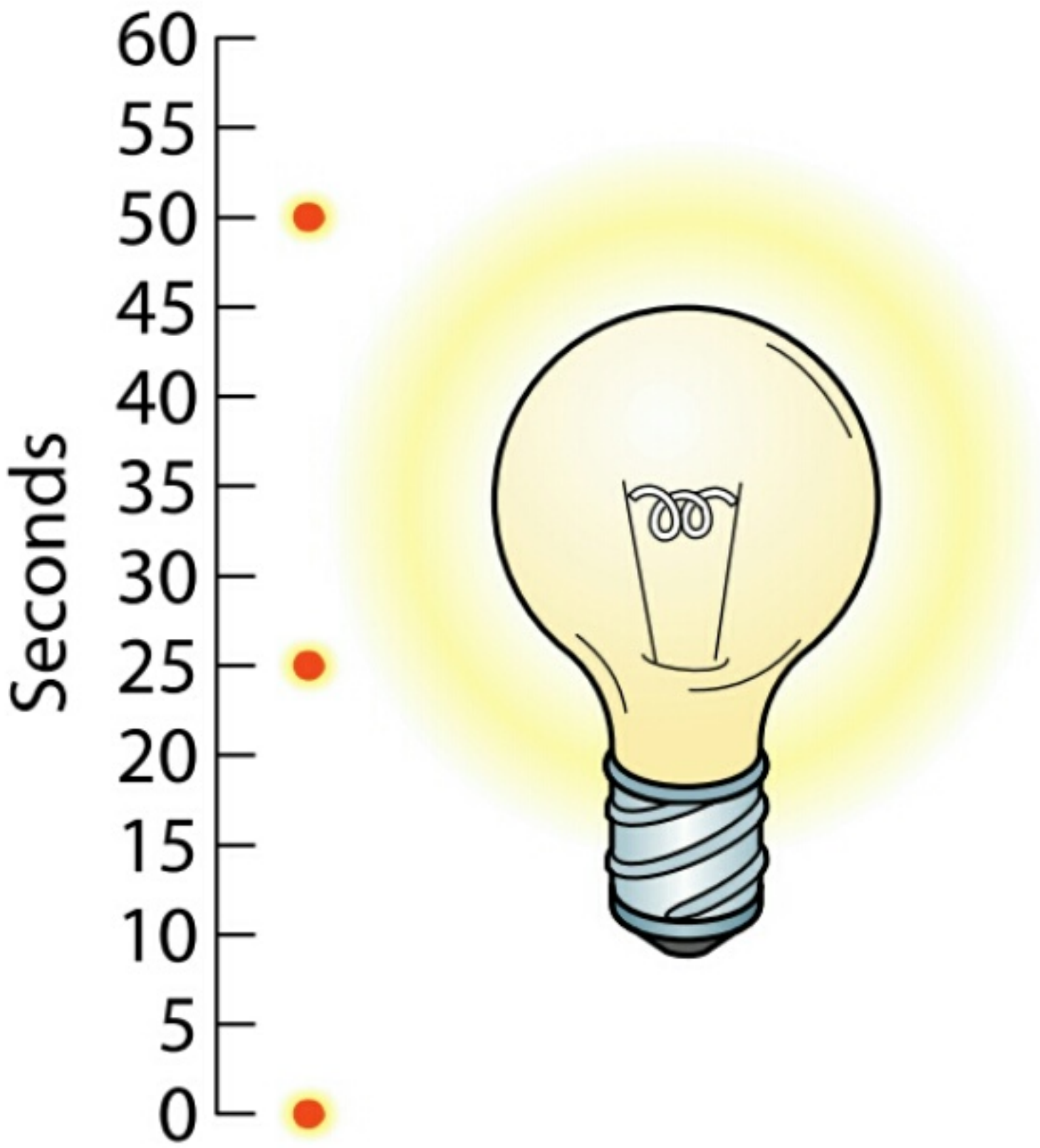
**1.** (i) 3                     (ii) 21, 24
     (iii) 27                (iv) 300

**2.** (i) 7, 14, 21, 28, 35, 42
     (ii) Yes                (iii) 147, 154

**3.** 9, 18, 27, 36, 45, 54, 63, 72

**4.** (i) 4, 8, 12, 16, 20, 24    (ii) 6, 12, 18, 24, 30, 36
     (iii) 12 and 24         (iv) 12

**5.** (i) 10        (ii) 24         (iii) 28
     (iv) 60        (v) 56

**6.** (i) 8             (ii) 12
     (iii) 30          (iv) 24

**7.** (i) 6, 8 etc.        (ii) 3, 6, 8 etc.

**8.** (i) 3, 9, 12            (ii) 3, 5, 9

**9.** 24

**10.** (i)

| 12 | 24 | 36 | 48 | 60 | 72 | → | 60 |
|----|----|----|----|----|----|---|----|
| 15 | 30 | 45 | 60 | 75 | 90 | | |

     (ii) 3, 4            (iii) 6, 7

**11.** (i) T     (ii) F     (iii) F     (iv) T

**12.** (ii) Line 3: multiples of 4;
        Line 4: multiples of 14
     (iii) Multiples of 10

**13.** 150 seconds

# Answers