

OLYMPIAD · MENTAL ABILITY · OLYMPIAD PREPARATION · SHORT NOTES

Chapter 7: Mirror and Water Images

Topic-wise short notes with solved examples

What a mirror image and a water image are, which letters and words stay the same, and how to find the mirror image of a clock time.

1 Mirror image and water image

- A **mirror image** is what you see when a mirror is placed **beside** an object, on its left or right side. It turns the object **left to right**: the left side becomes the right side.
- A **water image** is what you see in water **below** an object, or when the mirror lies **under** it. It turns the object **upside down**: the top becomes the bottom, and the left stays on the left.
- In a mirror at the **right** side of a word, the **order of the letters is reversed** and each letter is turned around. The last letter of the word is nearest to the mirror, so it appears at the **left** of the image.

Example 1.1 A mirror is placed on the right of the word STAR. Which letter appears at the extreme left of the image?

SOLUTION

The letter nearest to the mirror is R, the last letter of STAR. It appears first in the image.

R

- A person raising the right hand sees the image raising the **left** hand.

2 Letters and words that do not change

- A letter looks the **same** in a mirror (placed at the side) if it is symmetrical about a **vertical** line: **A, H, I, M, O, T, U, V, W, X, Y**.
- A letter looks the **same** in a water image if it is symmetrical about a **horizontal** line: **B, C, D, E, H, I, K, O, X**.
- A word looks the same in a mirror if all its letters are in the vertical list **and** the word reads the same forwards and backwards. Examples: MOM, WOW, TOT, MUM, AHA, OTTO.
- A word looks the same in a water image if all its letters are in the horizontal list. Examples: BOX, DICE, ECHO, CHECK, HIDE, BIKE.

Example 2.1 Which of these words looks the same in a water image: DICE, MAN, TAP, WIN?

SOLUTION

D, I, C and E are all symmetrical about a horizontal line. M, A, N, T, P, W are not all so.

DICE

Example 2.2 Which of these letters looks the same in a mirror: B, D, M, R?

SOLUTION

Only M is symmetrical about a vertical line.

M

3 Mirror image of a clock

- In the mirror image of a clock, the hour hand and the minute hand both swap sides. The reading is found by subtracting the time from 12:00.

$$\text{mirror image} = 12:00 - \text{time}$$

- On a clock face 12:20 is the same position as 0:20, so a time between 12:00 and 1:00 is treated as 0 hours and some minutes.
- You can also subtract the hours from 11 and the minutes from 60: the mirror image of 3:40 is $11 - 3 = 8$ hours and $60 - 40 = 20$ minutes.

Example 3.1 Find the mirror image of the time 3:40.

SOLUTION

$$12:00 - 3:40 = 8:20.$$

8:20

Example 3.2 Find the mirror image of the time 12:20.

SOLUTION

Treat 12:20 as 0:20 on the dial.

$$12:00 - 0:20 = 11:40.$$

11:40

REMEMBER

A mirror image of 3:00 is 9:00, and of 6:00 is 6:00. If your answer to a clock question is far from these, check your subtraction.