

# Eclipse geometry for CBSE Class 10: answers

CBSE Math Revision · CBSE Class 10 · Teacher answers and notes

No calculator. Every answer works out exactly.

## Teacher notes

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- Safety first: never look at the Sun directly, even during an eclipse. A pinhole viewer (task C) is a safe way to see it.
- Every physical value is a rounded value given in the question; the real values vary.
- Task B uses the standard angles from the Heights and distances chapter.

## Starter

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1.  **$1.4 \times 10^6$** 
  - $1\,400\,000 = 1.4 \times 1\,000\,000$
2.  **$1/400$** 
  - $1\,400\,000 \div 3500 = 400$
3. **9 m**
  - $12 \times 1.8 \div 2.4 = 9$
4.  **$\sqrt{3}$** 
  - Standard value.

## Task A: Why the Moon just covers the Sun

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- a. **400**
  - $1\,400\,000 \div 3500 = 400$
- b. **375 000 km**
  - $d/3500 = 150\,000\,000/1\,400\,000$
  - $d = 3500 \times 150\,000\,000/1\,400\,000 = 375\,000$
- c. **3360 km; yes**
  - Diameter =  $1\,400\,000 \times 360\,000/150\,000\,000 = 3360$  km.
  - $3500 > 3360$ , so the Moon covers the Sun completely: a total eclipse.

## Task B: Shadows and angles

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- a. **6 m**
  - $\tan 60^\circ = 6\sqrt{3}/s$ , so  $s = 6\sqrt{3}/\sqrt{3} = 6$ .
- b. **18 m**
  - $s = 6\sqrt{3} \div (1/\sqrt{3}) = 6 \times 3 = 18$
- c. **12 m**
  - $18 - 6 = 12$

## Task C: A pinhole viewer

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- a. **14 mm**
  - Image/1500 mm =  $1\,400\,000/150\,000\,000 = 7/750$
  - Image =  $1500 \times 7/750 = 14$  mm

b. **3 m**

- Twice the width needs twice the distance: 3 m.

c.  **$\frac{4}{3}$  m**

- Similar triangles:  $s/1.5 = (s + 4)/6$ .
- $6s = 1.5s + 6$ , so  $4.5s = 6$  and  $s = \frac{4}{3}$ .

## Extension

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1. **500 s = 8 minutes 20 seconds**

- $(1.5 \times 10^8) \div (3 \times 10^5) = 0.5 \times 10^3 = 500 \text{ s}$
- $500 = 8 \times 60 + 20$

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