

Eclipse geometry for CBSE Class 10

CBSE Math Revision · CBSE Class 10 · Student sheet

Name _____

Class _____

Date _____

No calculator. Every answer works out exactly.

Starter (5 minutes)

1. Write 1 400 000 in standard form.
2. Simplify $3500/1\,400\,000$.
3. A 1.8 m person casts a 2.4 m shadow. At the same time a tree casts a 12 m shadow. How tall is the tree?
4. Write down $\tan 60^\circ$.

Main activity (35 minutes)

Task A: Why the Moon just covers the Sun

Take these rounded values: Sun diameter 1 400 000 km at 150 000 000 km from us; Moon diameter 3500 km at 380 000 km.

- a. How many times wider is the Sun than the Moon?
- b. Use similar triangles to find the distance at which the Moon would exactly cover the Sun.
- c. When the Moon is 360 000 km away, what is the smallest diameter a disc there would need to cover the Sun? Can the 3500 km Moon cover it?

Task B: Shadows and angles

Use the standard values $\tan 30^\circ = 1/\sqrt{3}$ and $\tan 60^\circ = \sqrt{3}$.

- a. A pole is $6\sqrt{3}$ m tall. Find the length of its shadow when the Sun's angle of elevation is 60° .
- b. Find the length of the shadow when the angle of elevation is 30° .
- c. By how much does the shadow grow as the angle of elevation falls from 60° to 30° ?

Task C: A pinhole viewer

Never look at the Sun. A pinhole in a card makes a safe image on a screen behind it; the image and the Sun make similar triangles with the pinhole.

- a. The screen is 1.5 m behind the pinhole. Find the width of the Sun's image in millimetres.
- b. How far behind the pinhole must the screen be for an image 28 mm wide?
- c. A 1.5 m tall girl stands 4 m from a 6 m tall lamp post. Find the length of her shadow.

Extension

1. Light travels about 3×10^5 km each second. Using a Sun distance of 1.5×10^8 km, how long does sunlight take to reach us? Give minutes and seconds.