Lenses and magnification

Physics calculations (separate Physics only) | AQA GCSE Physics 8463 only (not Combined Science) | 12 questions, 36 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- magnification = $\frac{\text{image height}}{\text{object height}}$ learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 36**

1 A convex lens forms an image of a candle flame on a screen. The flame is 3.0 cm tall and the image is 12 cm tall.

Calculate the magnification.

(2 marks)

Answer _____

2 Priya looks at a stamp through a magnifying glass. A letter on the stamp is 0.8 cm tall. Through the magnifying glass the letter appears 2.0 cm tall.

Calculate the magnification of the magnifying glass.

(2 marks)

Answer _____

3 A camera lens forms an image of a person standing in a park. The person is 160 cm tall. The image on the camera sensor is 2.4 cm tall.

Calculate the magnification.

(2 marks)

Answer _____

4 On a biology field trip, Tomasz looks at a ladybird through a hand lens. The ladybird is 6 mm long. The image he sees is 2.4 cm long.

Calculate the magnification of the hand lens.

(3 marks)

Answer _____

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5 An old slide projector in a village hall throws a picture onto a screen. The picture on the slide is 36 mm tall. The image on the screen is 1.8 m tall.

Calculate the magnification of the projector lens.

(3 marks)

Answer _____

6 Grace uses a convex lens to make a magnified image of a small screw. She records these measurements.

Measurement	Value
height of the screw	4.0 mm
distance from the screw to the lens	6.0 cm
distance from the lens to the image	21 cm
height of the image	1.4 cm

Calculate the magnification.

(3 marks)

Answer _____

7 A magnifying glass has a magnification of 6. Jamal uses it to read a number on a map that is 0.35 cm tall.

Calculate the height of the image of the number.

(2 marks)

Answer _____

8 A jeweller looks at a gemstone through a lens with a magnification of 3.2. The image of the gemstone is 4.5 cm tall.

Calculate the real height of the gemstone.

Give your answer to 2 significant figures.

(3 marks)

Answer _____

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9 A classroom projector has a magnification of 40. The picture inside the projector is 24 mm tall. The screen is 3.0 m from the projector.

Calculate the height of the image on the screen in metres.

(3 marks)

Answer _____

10 Fatima tests two lenses, A and B.

- Lens A makes a 2.0 cm tall object look 5.0 cm tall.
- Lens B makes an 8 mm tall object look 2.6 cm tall.

a. Calculate the magnification of lens A.

b. Calculate the magnification of lens B.

c. Which lens gives the larger magnification? Show your working.

(4 marks)

Answer _____

11 Daniel connects a mini projector to his phone to show a film in his garden. The picture on the projector's display is 6.5 cm tall. The projector has a magnification of 22. His screen is 1.5 m tall.

a. Calculate the height of the projected image in metres.

b. The image fits on the screen. Calculate the gap left between the height of the image and the height of the screen, in cm. Show your working.

(4 marks)

Answer _____

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12 Zara photographs a block of flats that is 18 m tall. The image of the flats on the camera sensor is 9.0 mm tall.

a. Calculate the magnification of the camera lens. Give your answer in standard form.

b. Without moving the camera, Zara photographs a tree next to the flats. The image of the tree is 3.0 mm tall. Calculate the height of the tree in metres. Show your working.

(5 marks)

Answer _____

End of questions | Total 36 marks

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