

Geometric Optics Graphs: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3	
Total	Score	Total	Score	Total	Score
14		14		9	
Percentage =		Percentage =		Percentage =	

Geometric Optics Graphs: Attempt #1

Total = 14 Marks

Learners investigate how the path of a light ray incident on an air-glass boundary changes as it enters the glass medium.

Their results are shown in the table below.

angle i°	angle r°	$\sin i$	$\sin r$
15	10	0,259	0,174
25	16	0,423	0,276
45	28	0,707	0,469
55	33	0,819	0,545
60	35	0,866	0,574
70	39	0,940	0,629

- For this investigation, write down the:
 - Dependent variable (1)
 - Independent variable (1)
 - Constant (control) variable (1)
- Draw an appropriate graph of the data in the table and use it to obtain the refractive index of the glass material.

 USE THE GRAPH PAPER ATTACHED TO YOUR QUESTION PAPER TO ANSWER THIS QUESTION. (8)
- Use the result in QUESTION 6.2 to calculate the speed of light through the glass material. (3)

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Geometric Optics Graphs: Attempt #2 ⚡

Total = 14 Marks

Zingi and Tumi performed an investigation to identify an unknown material. They shone a ray of light on the unknown material, varying the angle of incidence and recording the angle of refraction. Results are recorded in **TABLE 6.1**.

TABLE 6.1:

Angle of incidence in degrees	0,0	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0
Angle of refraction in degrees	0,0	3,76	7,50	11,2	14,9	18,5	22,1	25,5	28,9

TABLE 6.2: Refractive indices of some materials. Refractive index in air (n_{air}) is calculated at standard temperature and pressure (STP).

Medium	Refractive index	Medium	Refractive index
Vacuum 1	1	Acetone	1,36
Helium	1,000036	Ethanol	1,36
Air*	1,0002926	Sugar solution (30%)	1,38
Carbon dioxide	1,00045	Fused quartz	1,46
Water: Ice	1,31	Glycerine	1,4729
Water: Liquid (20°C)	1,333	Sugar solution (80%)	1,49
Rock salt	1,516	Sapphire	1,77
Crown Glass	1,52	Glass (typical)	1,5 to 1,9
Sodium chloride	1,54	Cubic zirconia	2,15 to 2,18
Polystyrene	1,55 to 1,59	Diamond	2,419
Bromine	1,661	Silicon	4,01

- Write down the aim of the investigation. (2)
- Identify the following variables for the above investigation:
 - Independent (1)
 - Dependent (1)
- Use:
 - TABLE 6.1** to calculate the refractive index of the unknown material (4)
 - TABLE 6.2** to identify the material (1)
- If the refractive indices of air and sodium chloride are 1.00 and 1.54 respectively. Calculate the critical angle. (5)

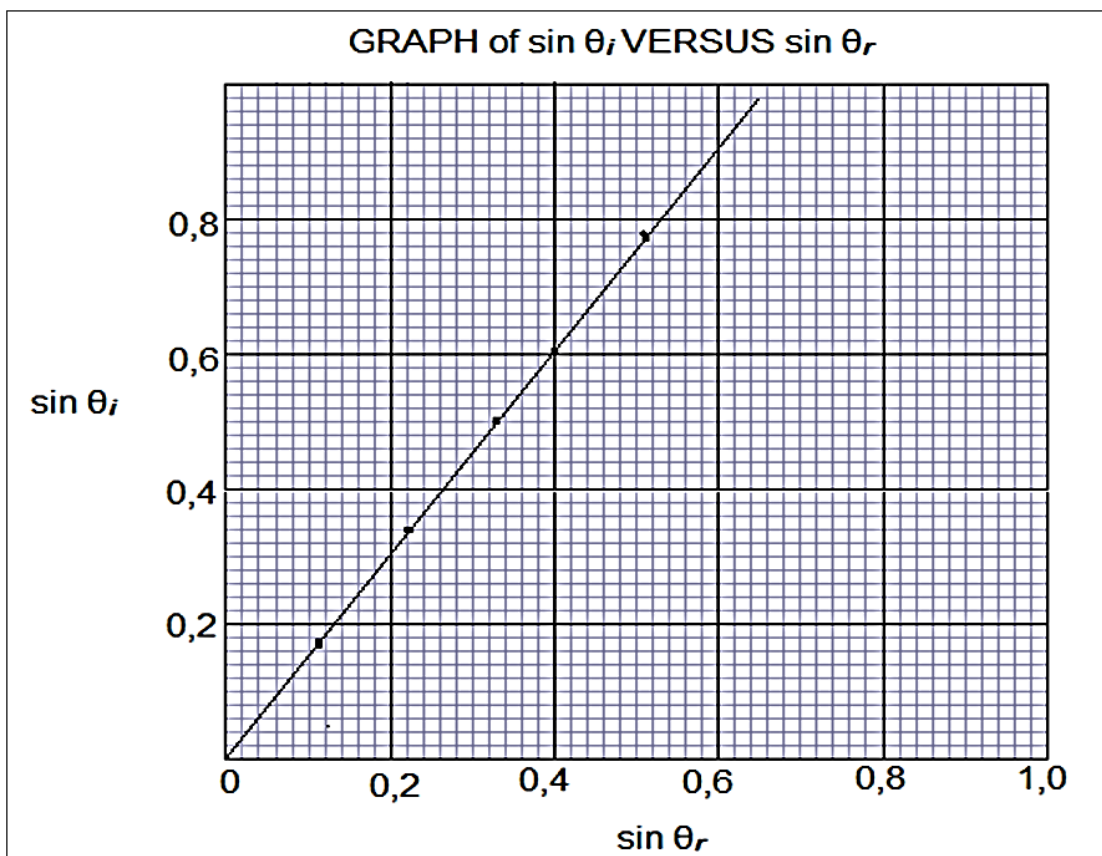
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Geometric Optics Graphs: Attempt #3 ⚡

Total = 9 Marks

Learners passed light from a ray box through a rectangular glass block to verify Snell's law. The results obtained are used to draw the graph below.



1. Write down the independent variable. (1)
2. Write down the variable that must be controlled. (1)
3. Write down the conclusion that can be obtained from the graph. (2)
4. USE THE GRAPH to determine the refraction index of the glass block. (4)

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