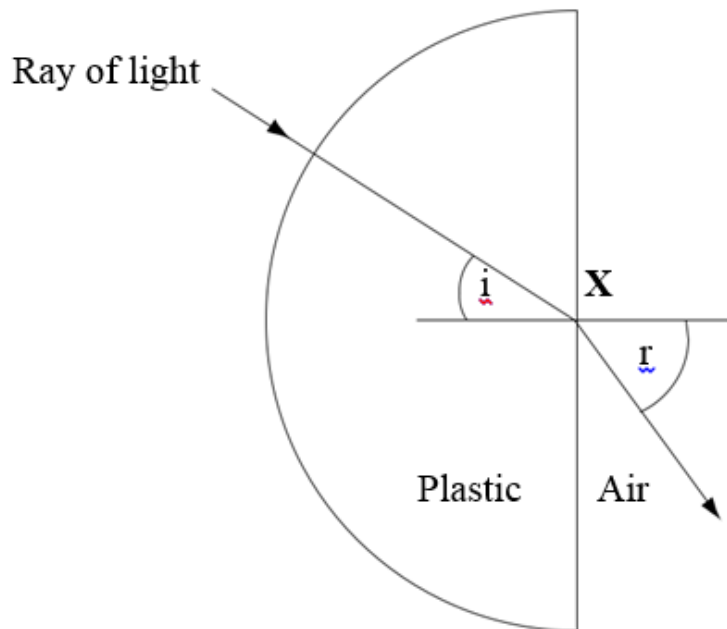


Refraction

Q1 (a) A student investigated the refraction of light as it passes out of a transparent plastic block.

She aimed a ray of light at point X. She marked the position of the ray as it passed through the transparent plastic block and into the air.

The angle i is the angle of incidence.



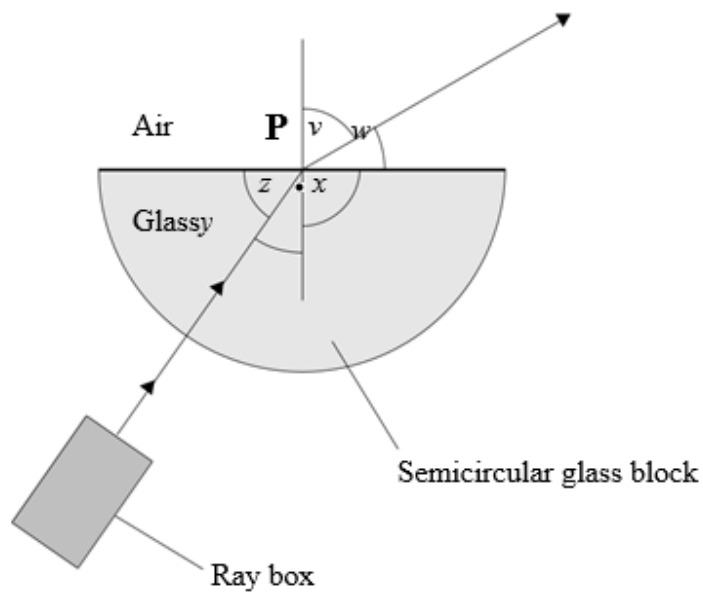
(a) (i) What is the name of angle r ?

(1 mark)

(a) (ii) What is the name of the dashed line?

(1 mark)

Q2. A student uses a ray box and a semicircular glass block to investigate refraction.



(a) What is the vertical dashed line called?

(1 mark)

(b) Which angle, v , w , x , y or z , is the angle of refraction?

(1 mark)

(c) Why has refraction taken place?

(1 mark)

(d) In an investigation, a student always aims the light from the ray box at point P. She moves the ray box to give different values of angle v .

She records angle y for each of these values. The table shows her results.

Angle v measured in degrees	Angle y measured in degrees
30	19
40	25
50	31
60	35
70	39
80	41

The student studies the data and comes to the following conclusion.

Angle y is directly proportional to angle v .

Her friend says that this conclusion is not correct.

(d) (i) Use data from the table to explain why the conclusion is not correct.

(2 marks)

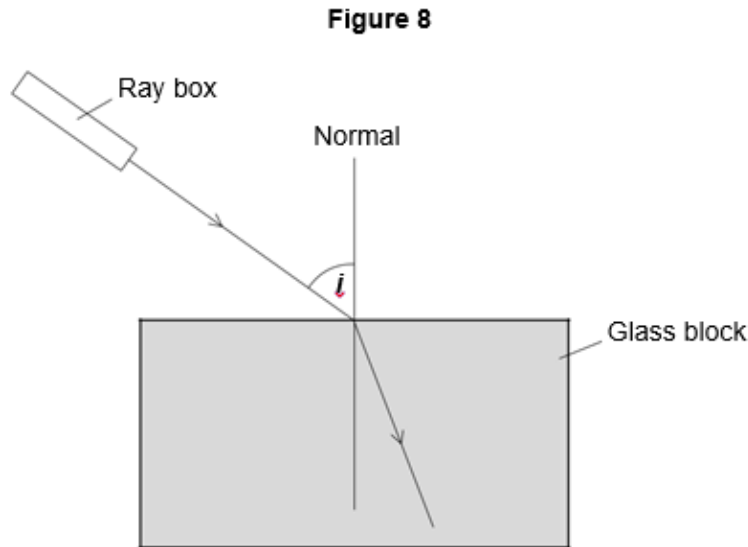
(d) (ii) Write a correct conclusion for the experiment.

(1 mark)

(d) (iii) Why is your conclusion only valid when angle v is between 30° and 80° ?

(1 mark)

Q3. (a) Figure 8 shows a ray of light entering a glass block.

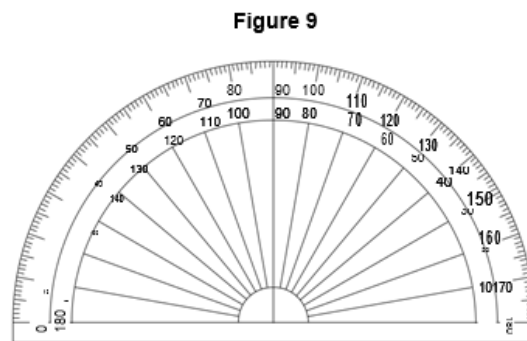


(a) (i) The angle of incidence in Figure 8 is labelled with the letter *i*.

On Figure 8, use the letter *r* to label the angle of refraction.

[1 mark]

(a) (ii) Figure 9 shows the protractor used to measure angles *i* and *r*.



What is the resolution of the protractor?

Tick (✓) **one** box.

1 degree

5 degrees

10 degrees

[1 mark]

(a) (iii) Table 1 shows calculated values for angle i and angle r from an investigation.

Table 1
$\sin i = 0.80$
$\sin r = 0.50$

Use the values from Table 1 to calculate the refractive index of the glass.

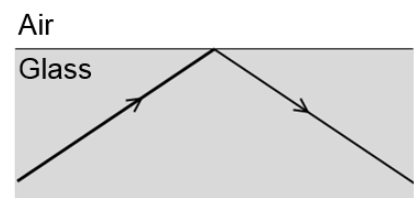
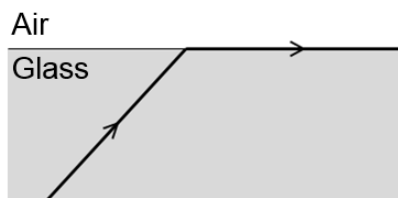
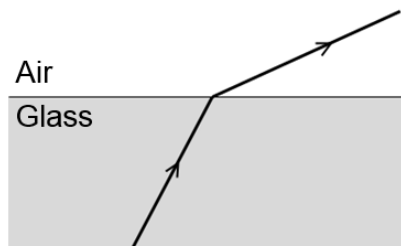
Use the correct equation from the Physics Equations Sheet.

Refractive index = _____
[2 marks]

(b) The diagrams below show a ray of light moving through glass.

Which diagram correctly shows what happens when the ray of light strikes the surface of the glass at the critical angle?

Tick (\checkmark) one box.



[1 mark]

Total: 14 Marks