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IGCSE PHYSICS 0625 · TOPICAL PAST PAPERS

Light

Paper 1 — Multiple-Choice Questions (topical compilation)

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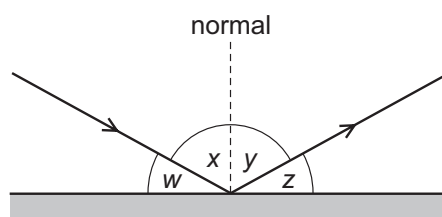
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3.2 Light

PAPER 1

- 1 A ray of light strikes a plane mirror and is reflected.

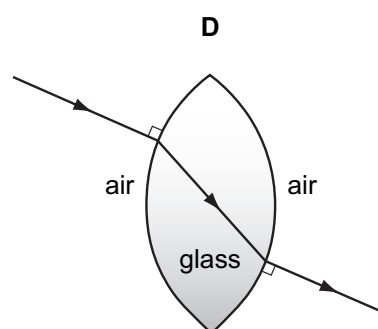
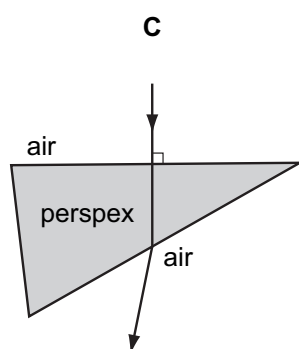
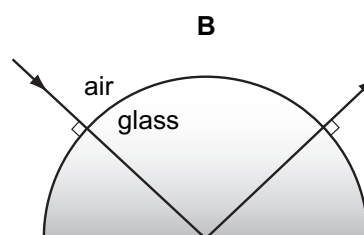
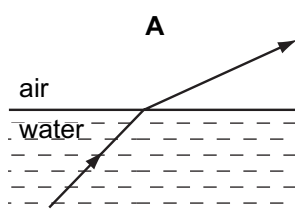


Which pair of angles **must** be equal in value?

- A** w and x **B** w and y **C** x and y **D** x and z

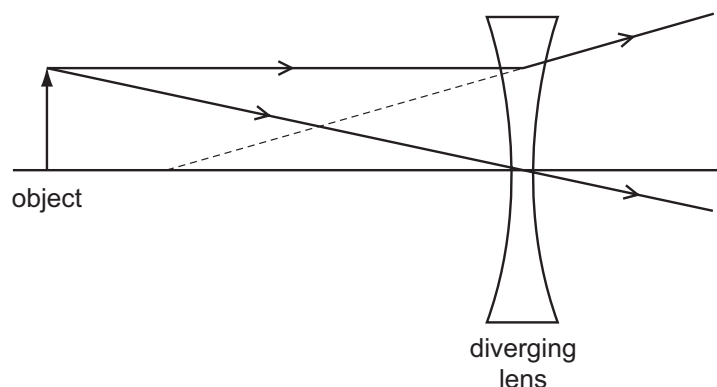
5054/11/M/J/11/Q21

- 2 In which diagram is the path of the light ray **not** correct?



5054/11/M/J/11/Q22

- 3 The ray diagram shows two rays from a point on an object placed in front of a diverging (concave) lens.

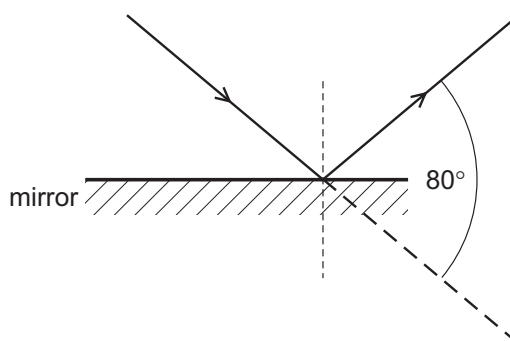


What are the properties of the image produced?

- A real and larger than the object
- B real and smaller than the object
- C virtual and larger than the object
- D virtual and smaller than the object

5054/11/M/J/11/Q23

- 4 Light is incident on a mirror and is reflected as shown.



What is the angle of incidence and the angle of reflection?

	angle of incidence / °	angle of reflection / °
A	40	40
B	40	50
C	50	40
D	50	50

5054/11/M/J/12/Q22

- 5 Light is incident on one face of a glass block at an angle of incidence of 40° . The glass block is in air.

The refractive index of the glass is 1.46.

What is the angle of refraction inside the glass block?

- A** 26° **B** 27° **C** 58° **D** 70°

5054/11/M/J/12/Q23

- 6 Light is incident on one face of a glass block at an angle of incidence of 40° . The glass block is in air.

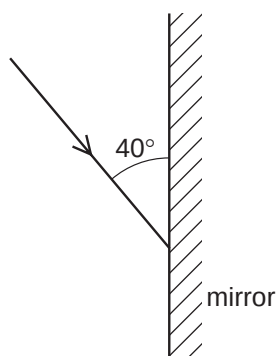
The refractive index of the glass is 1.46.

What is the angle of refraction inside the glass block?

- A** 26° **B** 27° **C** 58° **D** 70°

5054/11/M/J/12/Q23

- 7 The diagram shows a ray of light directed at a plane mirror.



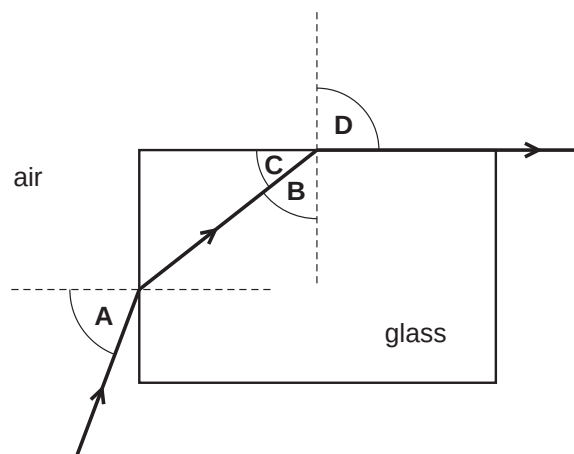
What are the angle of incidence and the angle of reflection?

	angle of incidence	angle of reflection
A	40°	40°
B	40°	50°
C	50°	40°
D	50°	50°

5054/12/M/J/12/Q22

- 8 Light travels through a glass block as shown.

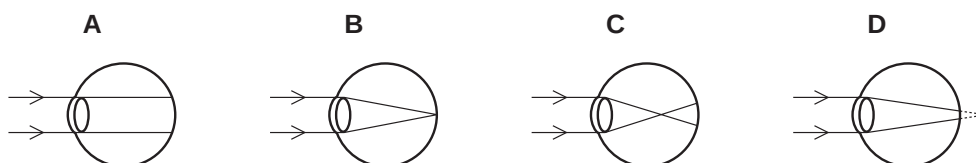
Which angle is the critical angle for light in the glass?



5054/12/M/J/12/Q23

- 9 A man is short-sighted.

Which ray diagram shows what happens in his eye when he looks at a distant object?



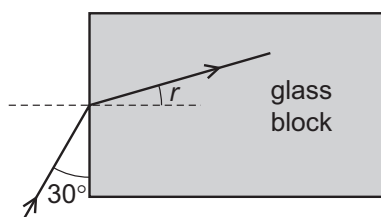
5054/12/M/J/12/Q24

- 10 Which characteristics describe an image formed by a vertical plane mirror?

- A real and inverted
- B virtual and not inverted
- C real and larger than the object
- D virtual and smaller than the object

5054/11/M/J/13/Q19

- 11 A ray of light meets the face of a glass block at an angle of 30° as shown.



The refractive index of the glass is 1.5.

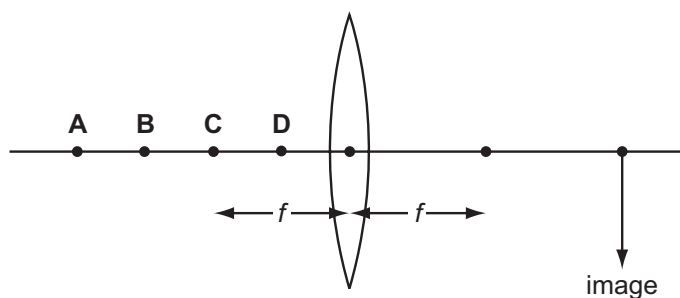
What is the angle of refraction r inside the glass block?

- A 19° B 20° C 35° D 40°

5054/11/M/J/13/Q20

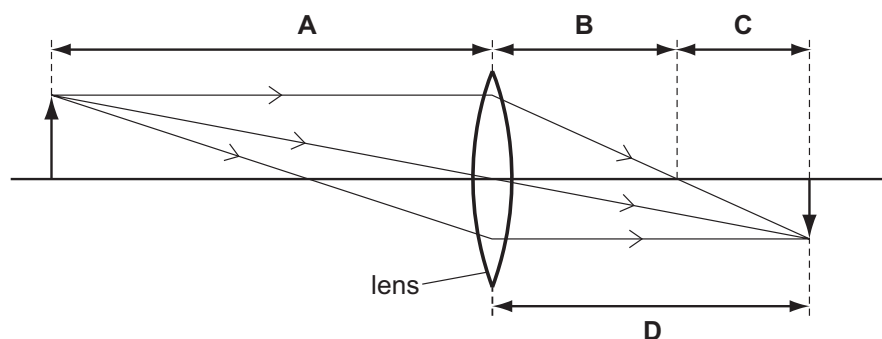
- 12 The diagram shows a thin converging lens of focal length f .

Where must an object be placed to produce a real image in the position shown?



5054/11/M/J/13/Q21

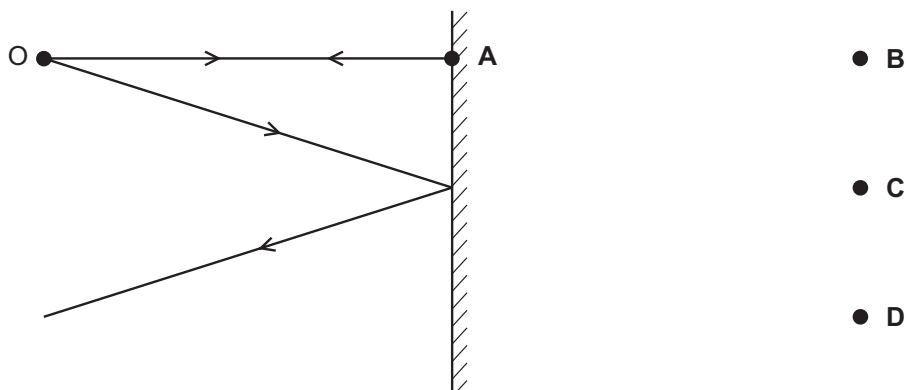
- 13 Which length is the focal length of the lens?



5054/12/M/J/13/Q26

- 14 The diagram shows two divergent rays of light from an object O being reflected from a plane mirror.

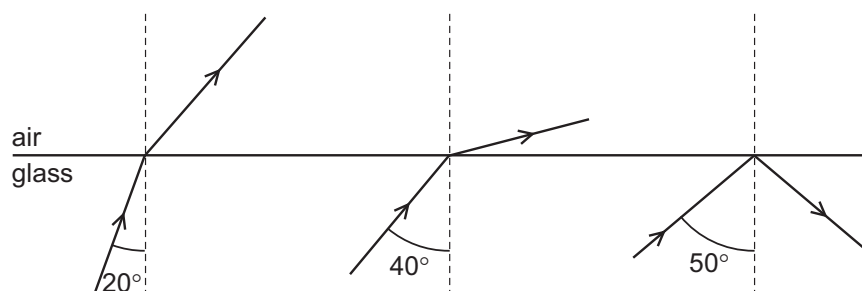
At which position is the image formed?



5054/11/M/J/14/Q24

- 15 Three rays of light are incident on the boundary between a glass block and air.

The angles of incidence are different.



What is a possible critical angle for light in the glass?

- A 15° B 30° C 45° D 60°

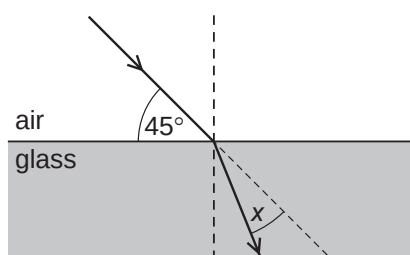
5054/11/M/J/14/Q25

- 16 Which row applies to a short-sighted eye viewing a distant object?

	position of the image	lens needed for correction
A	behind the retina	converging lens
B	behind the retina	diverging lens
C	in front of the retina	converging lens
D	in front of the retina	diverging lens

5054/11/M/J/14/Q27

- 17 A ray of light is incident on the surface of a glass block, as shown in the diagram below.



The refractive index of the glass is 1.5.

The light ray changes direction when entering the glass.

What is the angle x through which the ray moves?

- A 30° B 28° C 17° D 15°

5054/11/M/J/15/Q22

- 18 An image is formed by a thin converging lens when it is used as a magnifying glass.

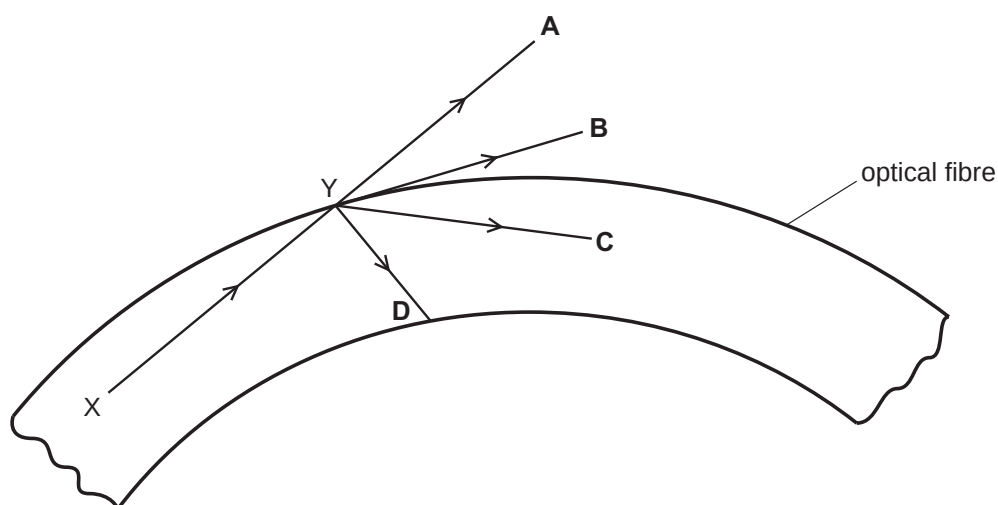
What is the correct description of the image?

- A real and erect
B real and inverted
C virtual and erect
D virtual and inverted

5054/11/M/J/15/Q23

- 19 A ray of light travels from X to Y along an optical fibre. The angle of incidence at Y is greater than the critical angle.

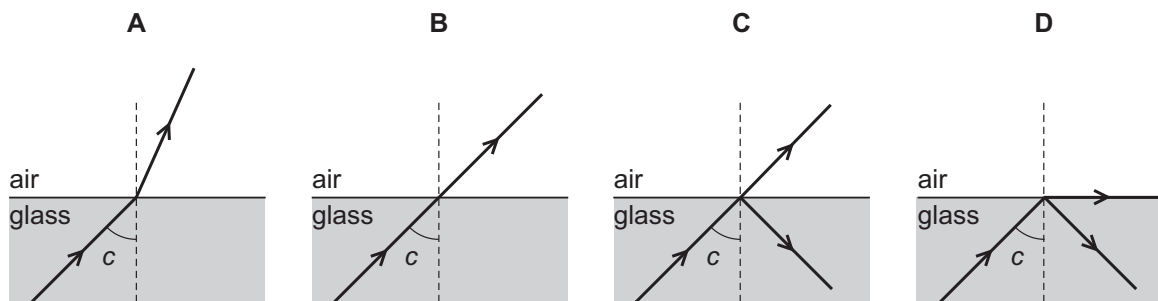
In which direction does the ray of light travel after reaching point Y?



5054/11/M/J/15/Q24

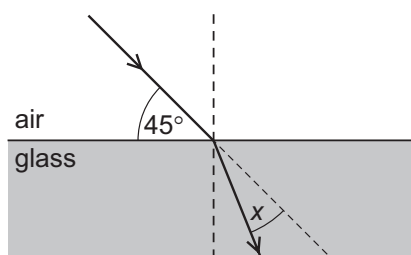
- 20 A ray of light in glass is incident on the surface at an angle c . The angle c is the critical angle.

Which diagram shows what happens to the light?



5054/12/M/J/15/Q25

- 21 A ray of light is incident on the surface of a glass block, as shown in the diagram below.



The refractive index of the glass is 1.5.

The light ray changes direction when entering the glass.

What is the angle x through which the ray moves?

- A 30° B 28° C 17° D 15°

5054/12/M/J/15/Q26

- 22 An image is formed by a thin converging lens when it is used as a magnifying glass.

What is the correct description of the image?

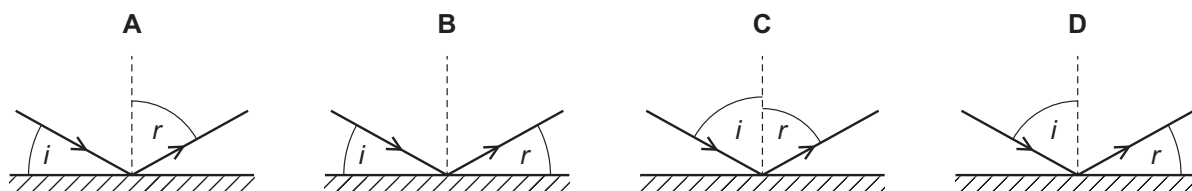
- A real and erect
 B real and inverted
 C virtual and erect
 D virtual and inverted

5054/12/M/J/15/Q27

- 23 Light is incident on a mirror. The light is reflected from the mirror.

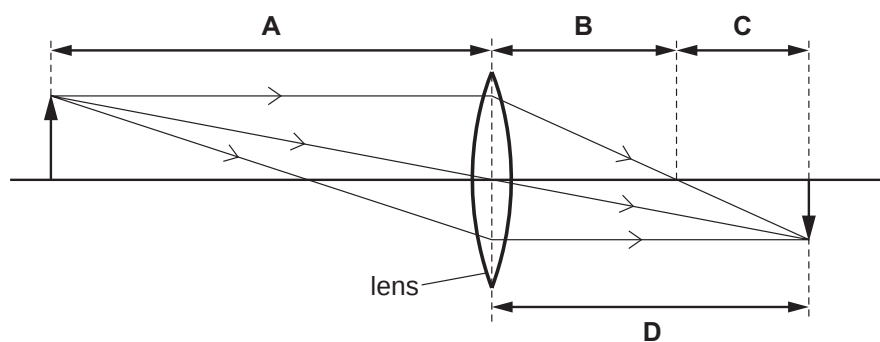
The angle of incidence is i and the angle of reflection is r .

Which diagram correctly shows i and r ?



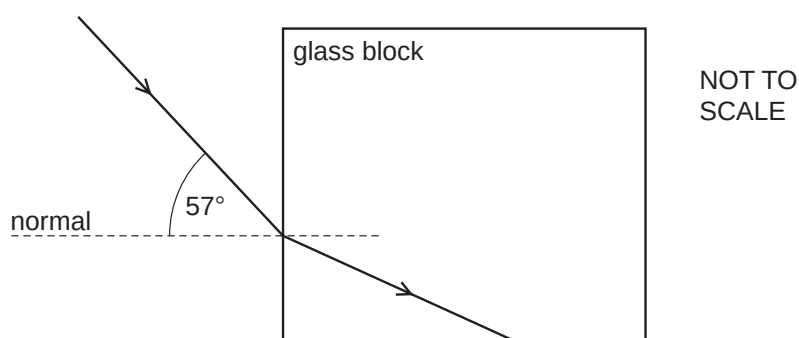
5054/11/M/J/16/Q21

- 24 Which length is the focal length of the lens shown in the diagram?



5054/11/M/J/16/Q22

- 25 Light passes from air into a glass block of refractive index 1.5, as shown.

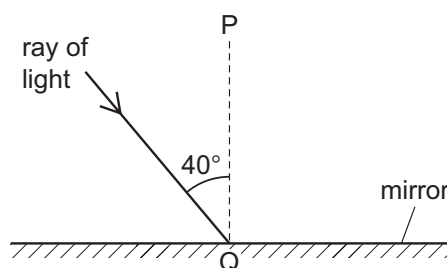


What is the angle of refraction in the glass and what is the critical angle?

	angle of refraction	critical angle
A	34°	42°
B	34°	60°
C	38°	42°
D	38°	60°

5054/11/M/J/16/Q23

- 26 The diagram shows light incident on a plane mirror.

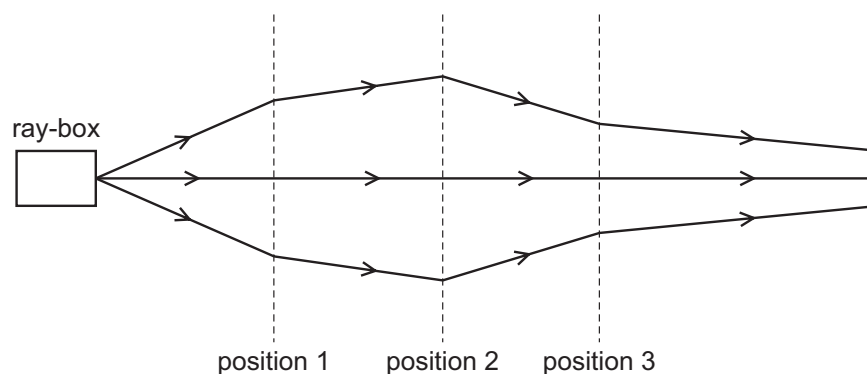


Which row gives the angle of reflection and the name of line PQ?

	angle of reflection	the line PQ is called the
A	40°	normal
B	40°	reflected ray
C	50°	normal
D	50°	reflected ray

5054/12/M/J/16/Q18

- 27 The rays of light from a ray-box pass through three lenses placed at positions 1, 2 and 3.

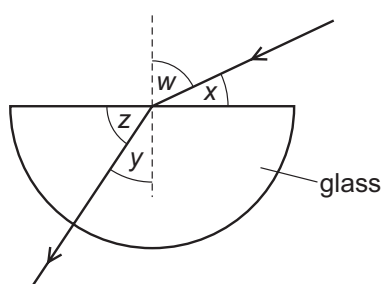


What type of lens is used at each position?

	position 1	position 2	position 3
A	converging	converging	converging
B	converging	converging	diverging
C	diverging	converging	diverging
D	diverging	diverging	converging

5054/12/M/J/16/Q20

- 28 Light passes from air into a block of glass, as shown.



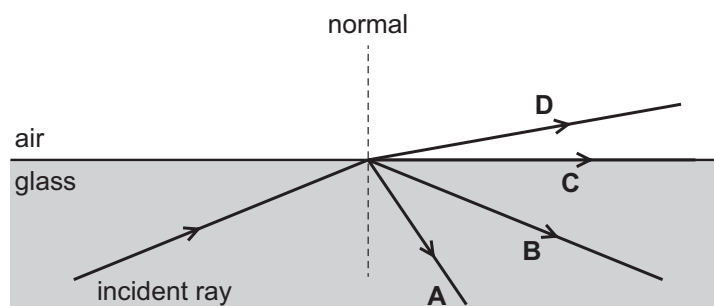
Which expression is equal to the refractive index of glass?

- A** $\frac{\sin w}{\sin y}$ **B** $\frac{\sin w}{\sin z}$ **C** $\frac{\sin y}{\sin w}$ **D** $\frac{\sin z}{\sin x}$

5054/12/M/J/16/Q21

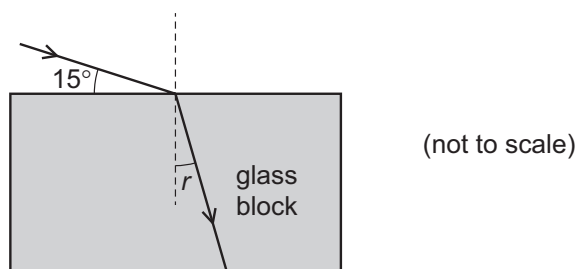
- 29 Light travelling in glass is incident on a glass-air boundary. The angle of incidence of the light is greater than the critical angle.

Which arrow shows the direction of the light after it is incident on the boundary?



5054/11/M/J/17/Q27

- 30 Light strikes the top surface of a glass block at an angle of 15° as shown.



The refractive index of glass is 1.5.

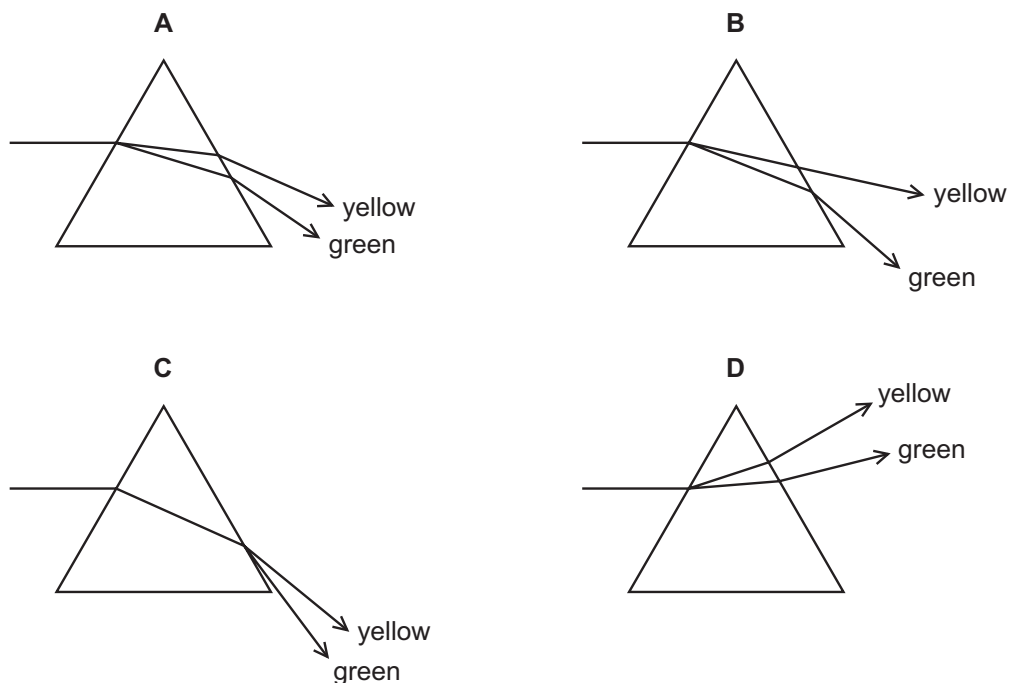
What is the angle of refraction r ?

- A 10° B 23° C 40° D 50°

5054/11/M/J/17/Q28

- 31 A narrow beam of yellow and green light is separated as it passes through a prism.

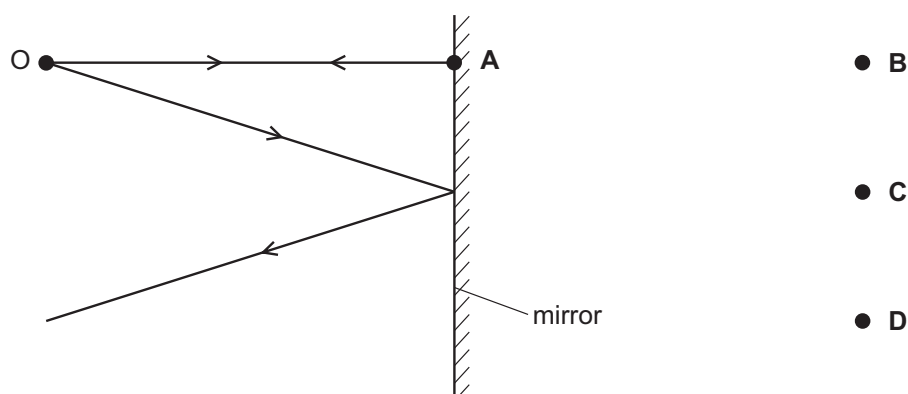
Which ray diagram is correct?



5054/12/M/J/17/Q28

- 32 The diagram shows two divergent rays of light from an object O being reflected from a plane mirror.

At which position is the image formed?



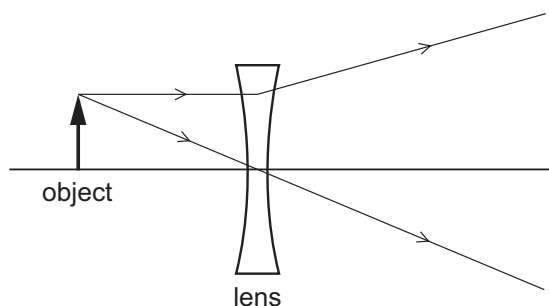
5054/11/M/J/18/Q22

33 Which statement is correct?

- A Total internal reflection only occurs when light travels from air into glass.
- B The larger the refractive index of glass, the larger is the critical angle.
- C When total internal reflection occurs, the angle of incidence is equal to the angle of reflection.
- D When total internal reflection occurs, the angle of incidence is less than the critical angle.

5054/11/M/J/18/Q23

34 The diagram shows the paths of two rays from the top of an object through a lens.



The object is viewed from the opposite side of the lens to the object.

How does the image compare with the object?

- A larger and inverted
- B larger and the same way up
- C smaller and inverted
- D smaller and the same way up

5054/11/M/J/18/Q24

35 Which statement about blue light is correct?

- A Blue light has a smaller frequency than red light.
- B Blue light has a longer wavelength than red light.
- C Blue light has the same speed in glass as red light.
- D Blue light is refracted more by a glass prism than red light.

5054/12/M/J/18/Q28

- 36 A ray of light strikes a plane mirror at an angle of incidence of 20° .

The angle of incidence is then increased by 5° .

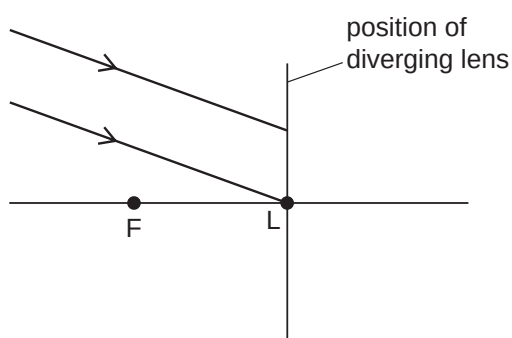
What is the new angle between the incident ray and the reflected ray?

- A 10° B 25° C 45° D 50°

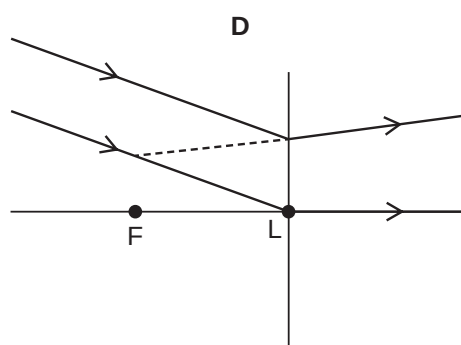
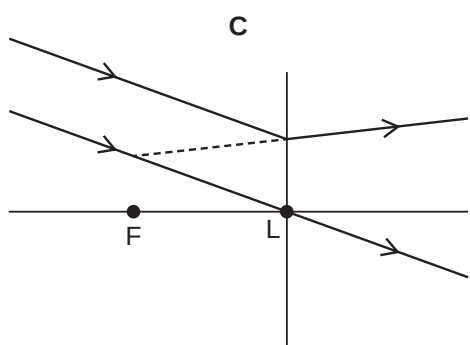
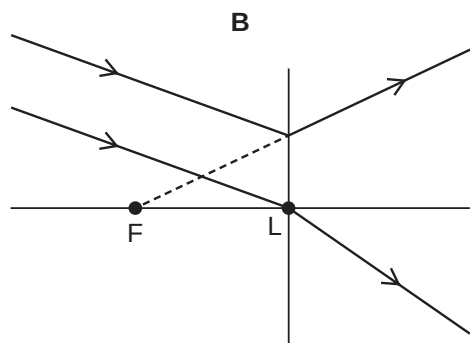
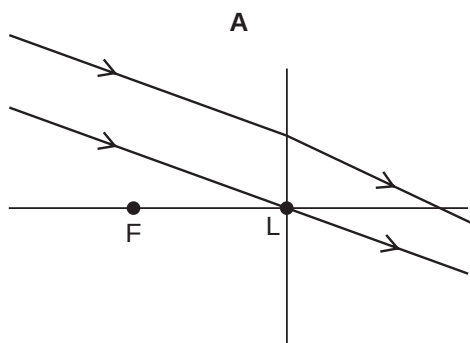
5054/11/M/J/19/Q24

- 37 A parallel beam of light is incident on a thin diverging lens.

The focal length of the lens is FL, as shown in the diagram.



Which ray diagram shows the beam after it has passed through the lens?



5054/11/M/J/19/Q25

- 38 The following lists show colours of the spectrum.

Which list shows these colours in order of increasing frequency?

- A blue, violet, red, orange, yellow, green
- B green, blue, violet, red, orange, yellow
- C red, orange, violet, yellow, green, blue
- D red, orange, yellow, green, blue, violet

5054/11/M/J/19/Q26

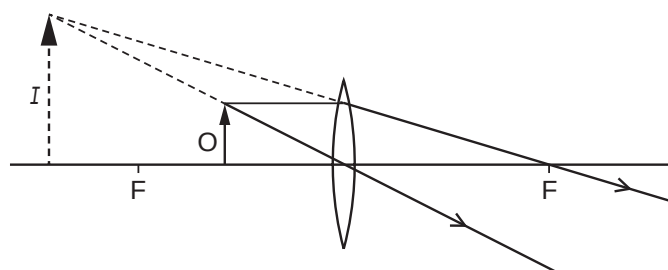
- 39 An object is placed at a distance from a converging lens that is equal to twice the focal length of the lens.

Which statement about the image is correct?

- A It is enlarged.
- B It is inverted.
- C It is on the same side of the lens as the object.
- D It is virtual.

5054/12/M/J/19/Q27

- 40 The lens in the diagram produces an image I of the object O .

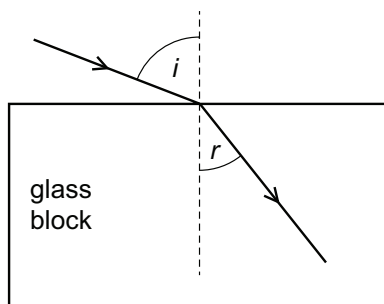


Why is this **not** the ray diagram for a photographic enlarger?

- A The image is magnified.
- B The image is virtual.
- C The lens is a converging lens.
- D The lens is too thin.

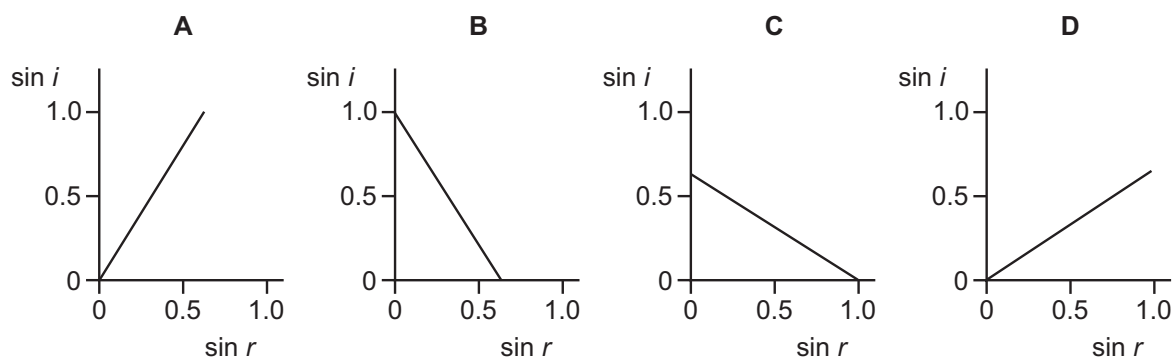
5054/12/M/J/19/Q28

- 41 Light enters a glass block at an angle of incidence i and it produces an angle of refraction r in the glass.



Several different values of i and r are measured, and a graph is drawn of $\sin i$ against $\sin r$.

Which graph is correct?

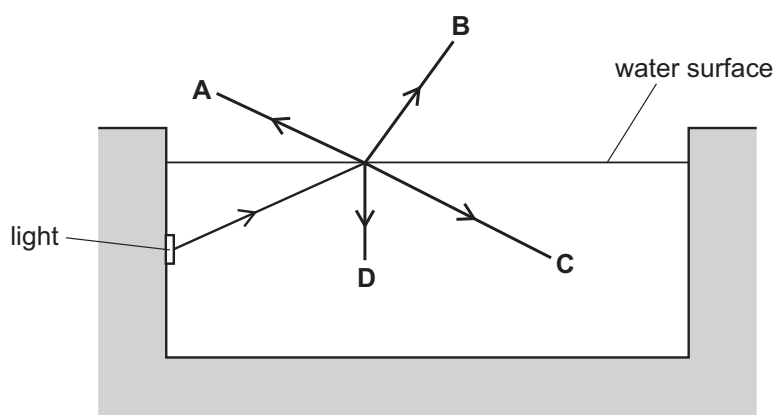


5054/11/M/J/20/Q26

- 42 A swimming pool is lit by an underwater light.

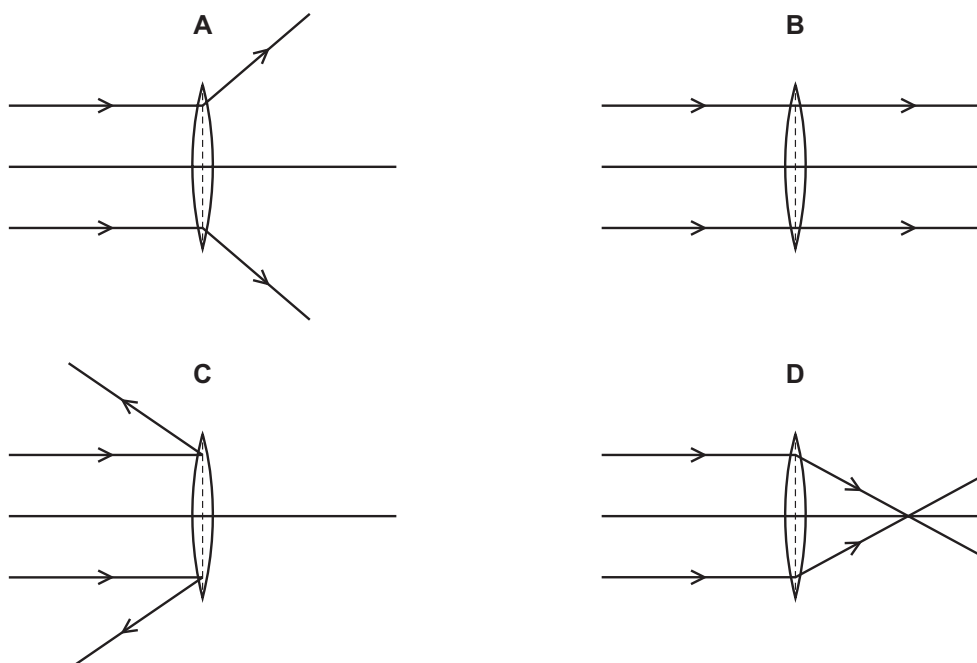
A ray of light is incident on the water surface.

What is the correct path for the ray of light?



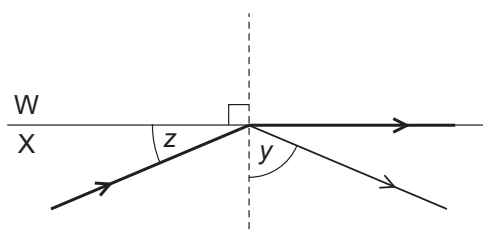
5054/11/M/J/20/Q27

- 43 Which diagram shows the action of a converging lens on a parallel beam of light?



5054/11/M/J/20/Q28

- 44 The diagram shows a ray of light incident on the boundary between two mediums W and X. The mediums have different refractive indexes.



Some light is reflected and some passes along the surface between the two mediums. Angle y is greater than angle z .

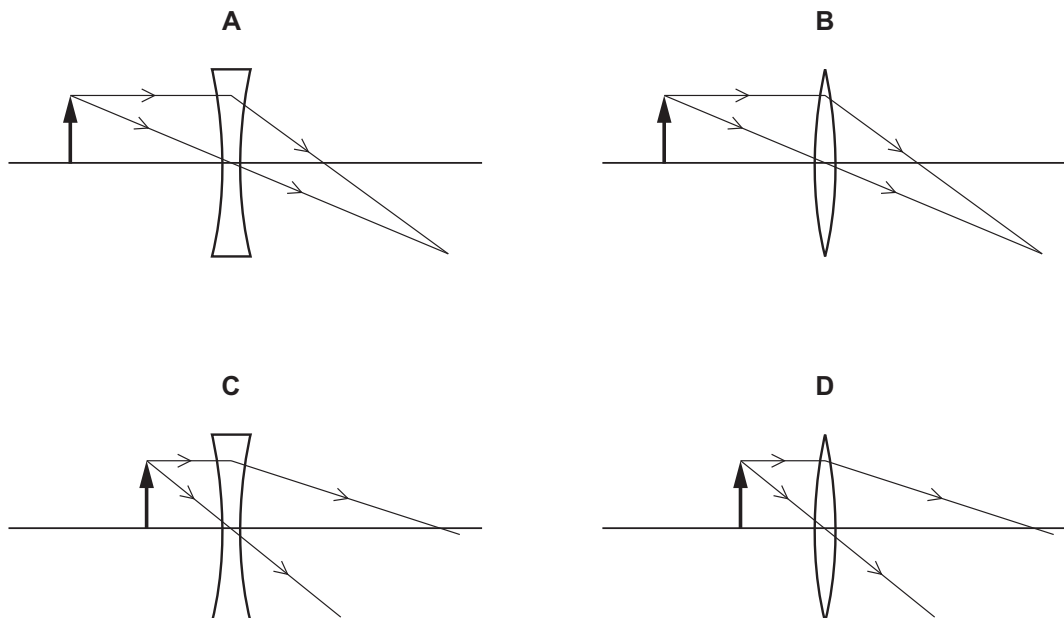
Which statement is correct?

- A W has a greater refractive index than X and angle y is equal to the critical angle.
- B W has a greater refractive index than X and angle z is equal to the critical angle.
- C X has a greater refractive index than W and angle y is equal to the critical angle.
- D X has a greater refractive index than W and angle z is equal to the critical angle.

5054/12/M/J/20/Q31

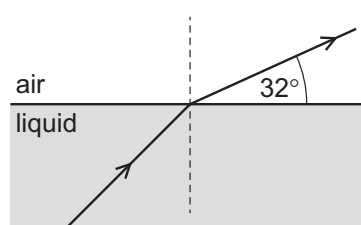
- 45 A converging glass lens is used to produce a virtual, magnified image.

Which ray diagram shows the rays passing through the converging lens?



5054/12/M/J/20/Q33

- 46 Light refracts from a liquid into air as shown.



not to scale

The refractive index for light moving from air to the liquid is 1.4.

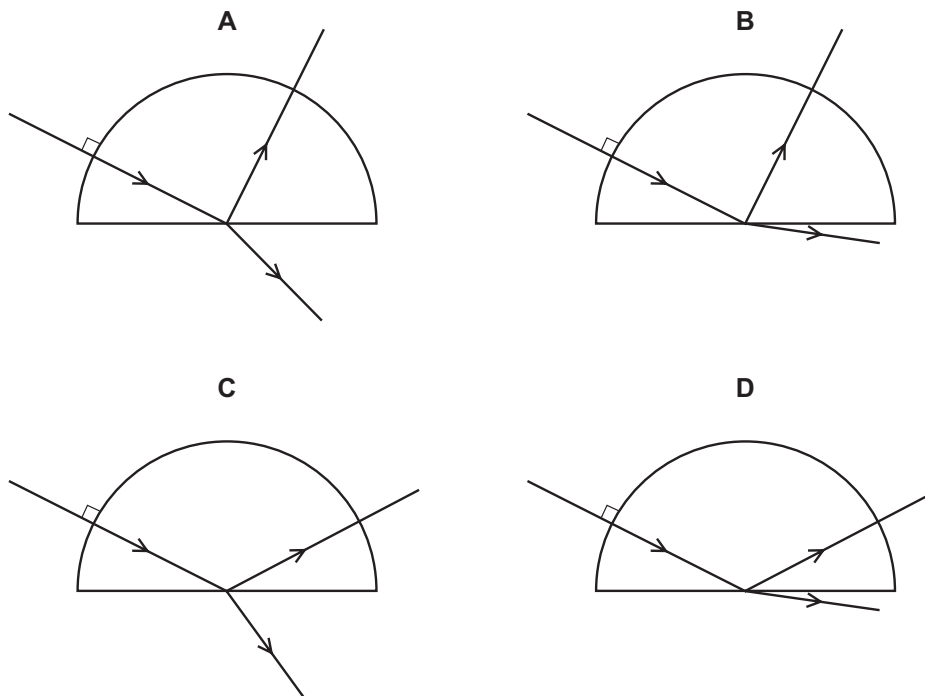
What is the angle of incidence in the liquid?

- A 22° B 37° C 41° D 45°

5054/11/M/J/21/Q21

- 47 A ray of red light in air enters a semi-circular block.

Which diagram shows the partial reflection and the refraction of the ray?



5054/11/M/J/21/Q22

- 48 Which statement about human vision is correct?

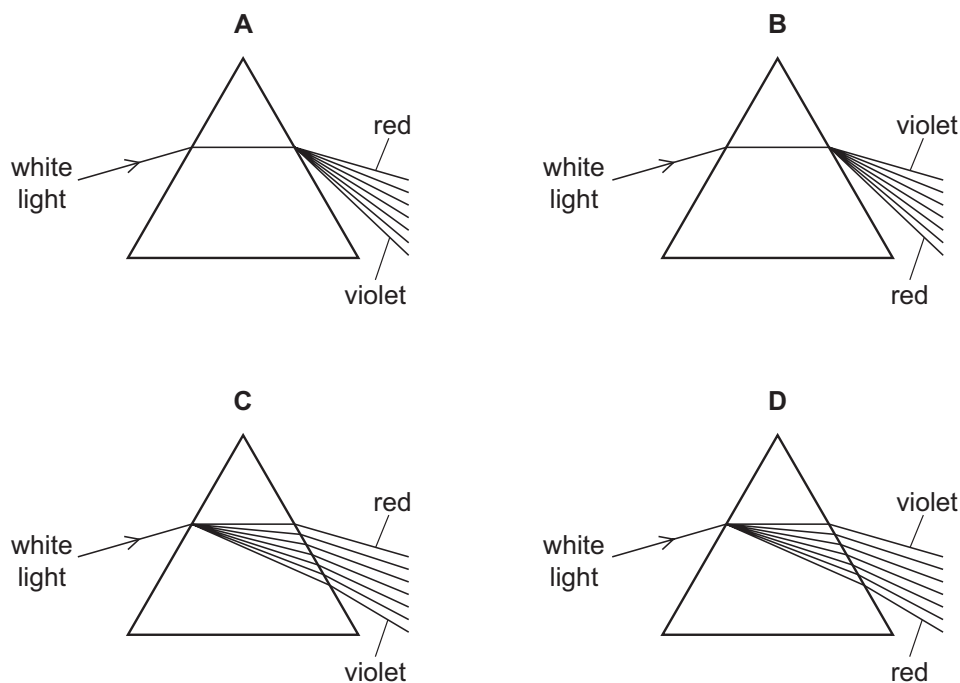
- A In a normal eye, the image on the retina is magnified and upright.
- B In a long-sighted eye, distant objects form images in front of the retina.
- C Short-sighted eyes produce only virtual images.
- D Short-sight is corrected by the use of a diverging lens.

5054/11/M/J/21/Q23

- 49 White light enters a prism and forms a spectrum.

The rays in the air are labelled.

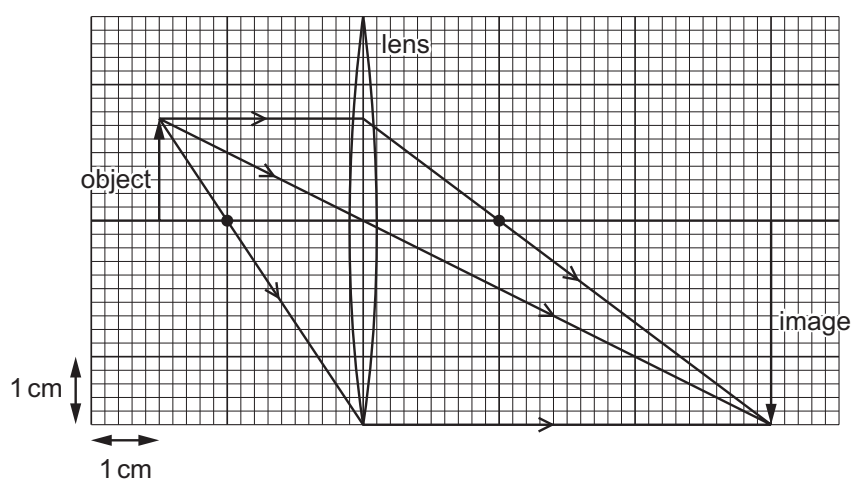
Which diagram shows how the white light is dispersed by the prism?



5054/11/M/J/21/Q24

- 50 An object of height 1.5 cm is placed in front of a converging lens of focal length 2.0 cm.

The arrangement is shown on the full-scale ray diagram.



What is the linear magnification produced by the lens?

- A 2.0 B 3.0 C 4.0 D 6.0

5054/12/M/J/21/Q25

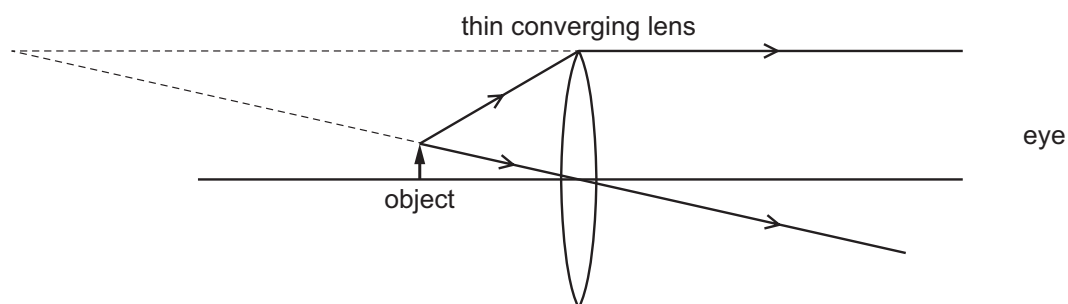
51 In which optical instrument is the distance between the object and the lens less than the focal length of the lens?

- A camera
- B magnifying glass
- C photographic enlarger
- D projector

5054/12/M/J/21/Q26

52 An object is viewed through a thin converging lens.

The diagram shows the paths of two rays from the top of the object to an eye.

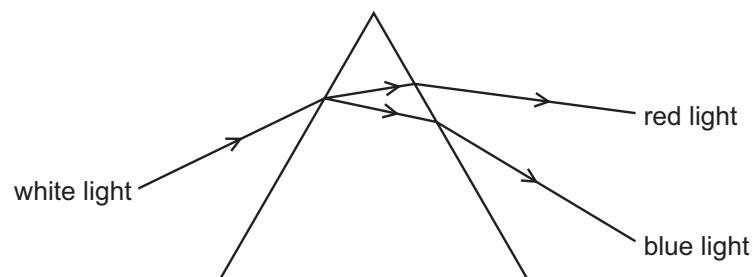


How does the image compare with the object?

- A It is larger and inverted.
- B It is larger and upright.
- C It is smaller and inverted.
- D It is smaller and upright.

5054/11/M/J/22/Q21

- 53 A ray of white light enters a prism as shown.

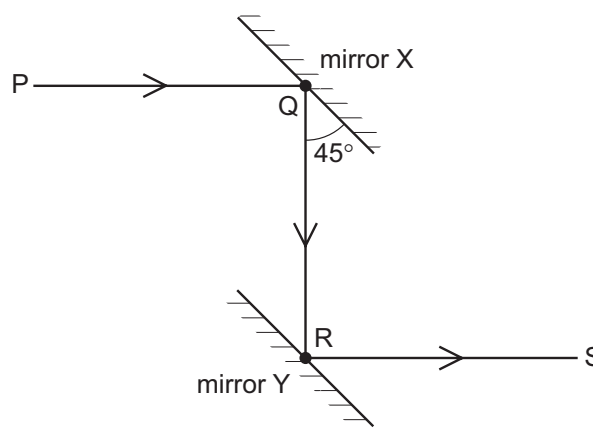


Which row is correct?

	wave properties observed	frequency of red light compared with frequency of blue light
A	dispersion only	smaller
B	refraction only	greater
C	dispersion and refraction	smaller
D	dispersion and refraction	greater

5054/11/M/J/22/Q22

- 54 The diagram shows a ray PQ reflected by mirror X to a parallel mirror Y. The reflected ray along RS is parallel to PQ.



Which statement is correct?

- A** The angle between PQ and QR is 45° .
- B** The angle between QR and RS is 180° .
- C** The angle of incidence of PQ on mirror X is 60° .
- D** The angle of incidence of QR on mirror Y is 45° .

5054/12/M/J/22/Q24

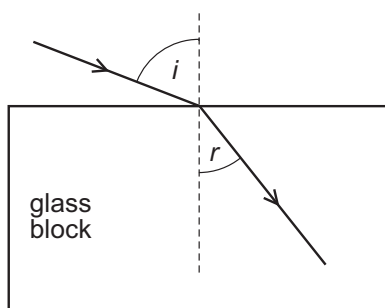
- 55 Violet and indigo light have the shortest wavelengths in the spectrum of visible light.

Which three colours, in order of increasing wavelength, immediately follow indigo?

- A blue → green → orange
- B blue → green → yellow
- C green → blue → yellow
- D yellow → green → orange

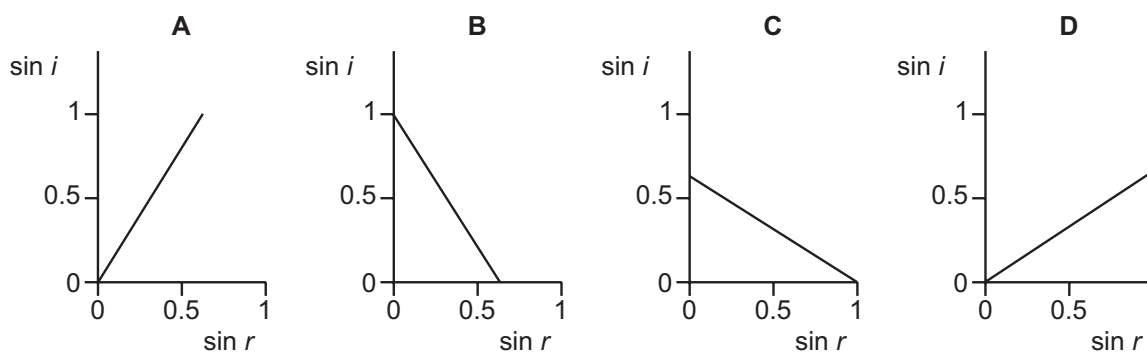
5054/12/M/J/22/Q26

- 56 A ray of light enters a glass block at an angle of incidence i producing an angle of refraction r in the glass.



Several different values of i and r are measured, and a graph is drawn of $\sin i$ against $\sin r$.

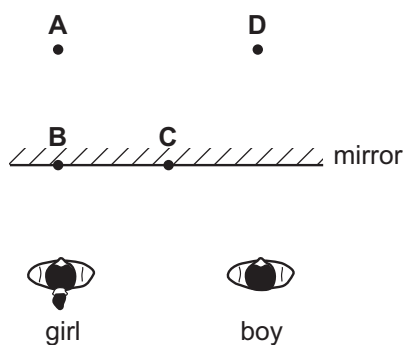
Which graph is correct?



5054/11/O/N/11/Q21

- 57 A boy stands beside a girl in front of a large plane mirror. They are both the same distance from the mirror, as shown.

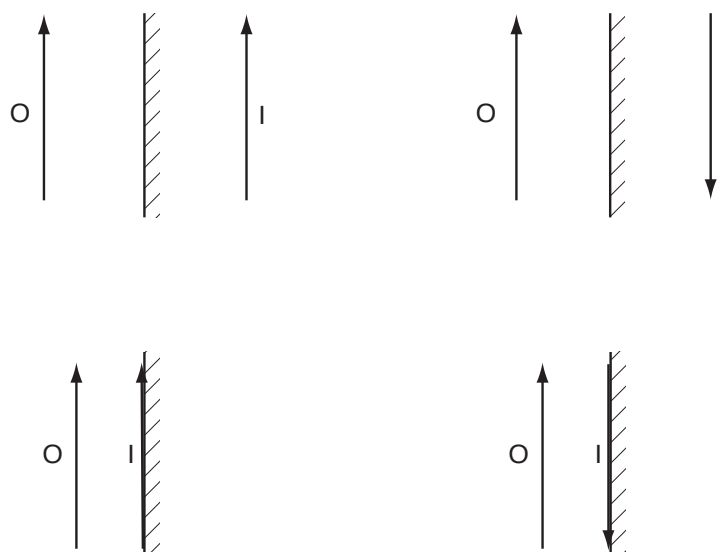
Where does the boy see the girl's image?



5054/11/O/N/11/Q22

- 58 An object O is placed in front of a plane mirror.

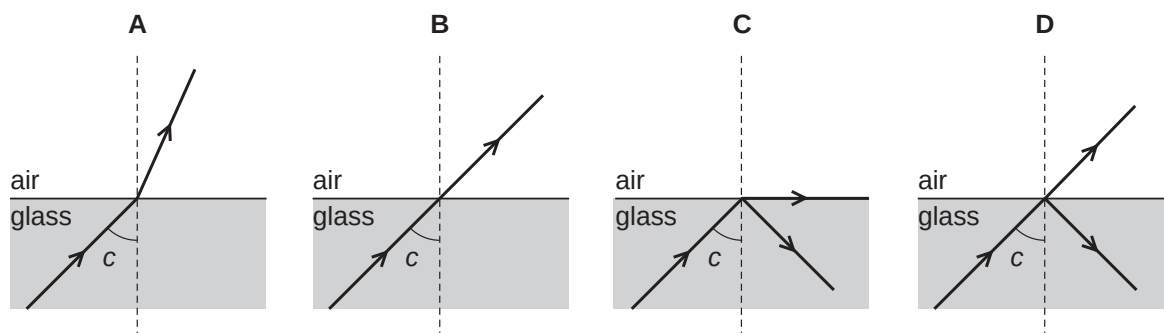
Which diagram correctly represents the image I formed by the mirror?



5054/11/O/N/12/Q22

- 59 In the following diagrams, the angle c is the critical angle.

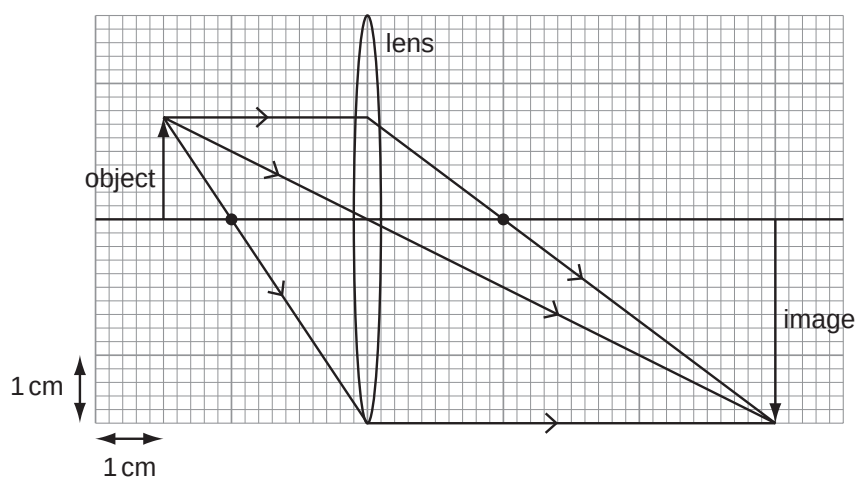
Which diagram shows the correct path of the light ray?



5054/11/O/N/12/Q23

- 60 An object of height 1.5 cm is placed in front of a converging lens of focal length 2.0 cm.

The arrangement is shown on the full-scale ray diagram.



What is the linear magnification produced by the lens?

- A 2.0 B 3.0 C 4.0 D 6.0

5054/11/O/N/12/Q24

- 61 Red and violet are the colours at the ends of the visible spectrum.

How do the frequencies and the wavelengths of these colours compare?

	higher frequency	longer wavelength
A	red	red
B	red	violet
C	violet	red
D	violet	violet

5054/11/O/N/12/Q25

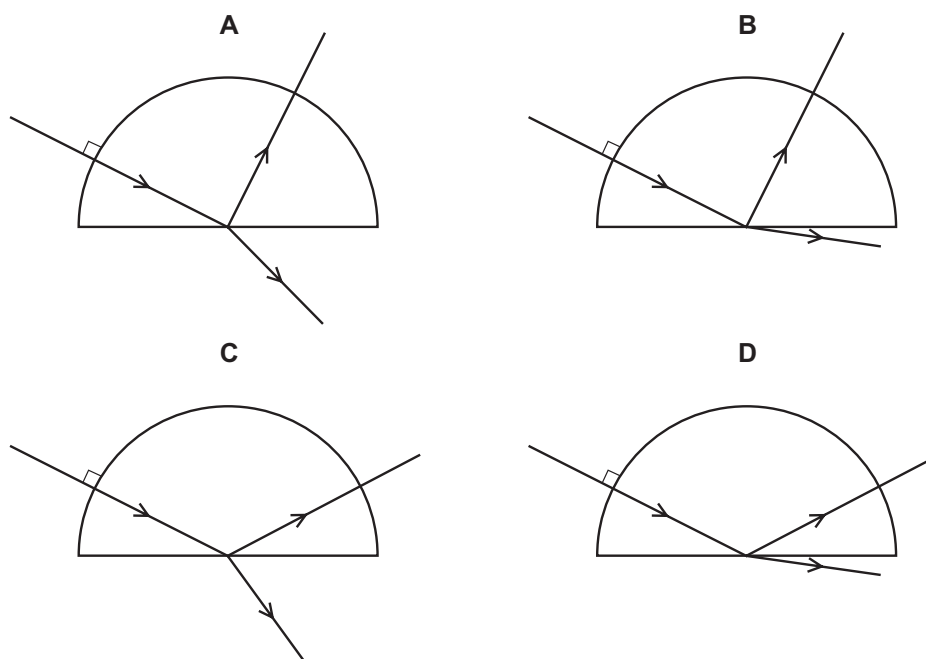
- 62 An object is placed in front of a plane mirror. The image produced is

- A** real and smaller than the object.
- B** real and the same size as the object.
- C** virtual and smaller than the object.
- D** virtual and the same size as the object.

5054/12/O/N/12/Q22

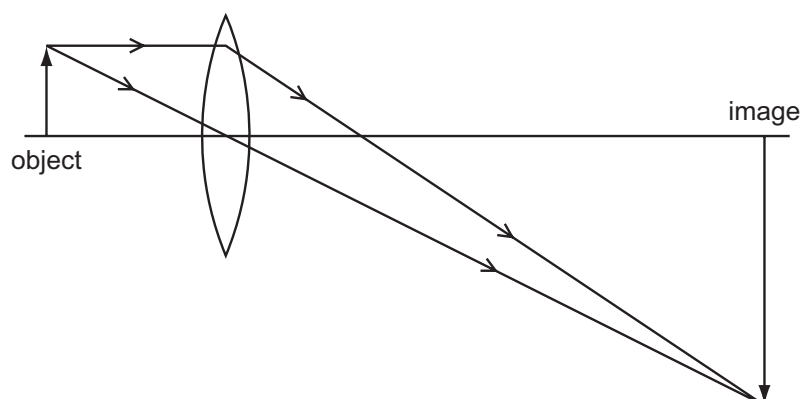
- 63 A ray of red light enters a semi-circular glass block normal to the curved surface.

Which diagram shows the partial reflection and refraction of the ray?



5054/12/O/N/12/Q23

- 64 A lens is used to produce a magnified image, as shown in the scale diagram.



What is the linear magnification of the object?

- A** 0.33 **B** 3.0 **C** 4.0 **D** 6.0

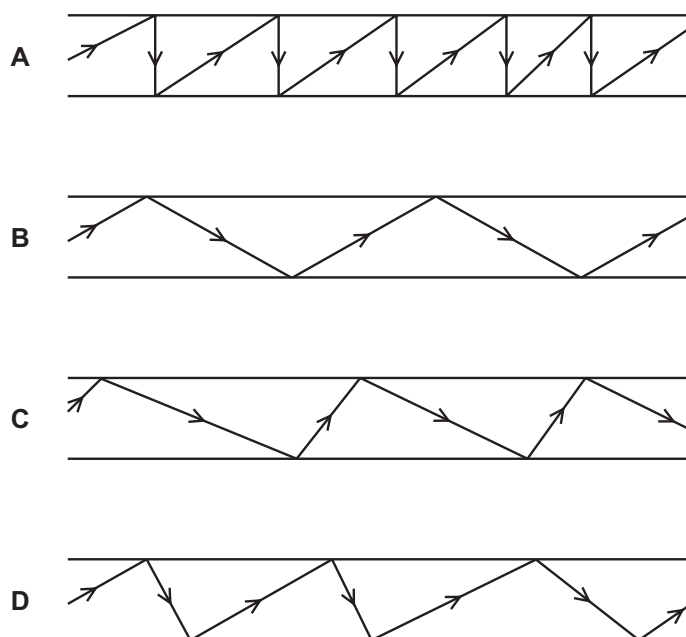
5054/12/O/N/12/Q24

- 65 Which statement about red light and blue light is correct?

- A** Red light has a higher frequency than blue light.
B Red light has a longer wavelength than blue light.
C Red light has the same speed in glass as blue light.
D Red light is refracted by a glass prism more than blue light.

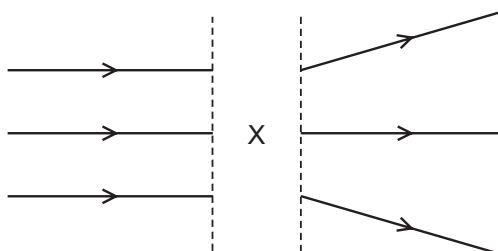
5054/12/O/N/12/Q25

66 Which diagram represents the reflection of light along an optical fibre?



5054/11/O/N/13/Q20

67 The diagram shows rays of light.

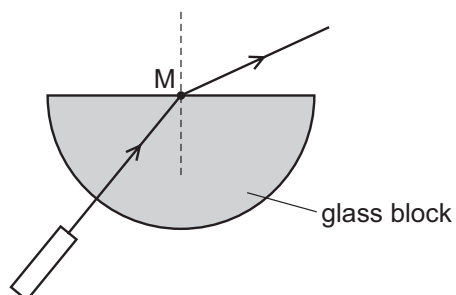


What is in the space labelled X?

- A a converging lens
- B a diverging lens
- C a plane mirror
- D a rectangular glass block

5054/11/O/N/13/Q21

- 68 A ray of red light from a laser passes into a semi-circular glass block.



What is shown at M?

- A dispersion
- B rarefaction
- C reflection
- D refraction

5054/12/O/N/13/Q23

- 69 A ray of light strikes the surface of a glass block at an angle of incidence of 45° .

The refractive index of the glass is 1.8.

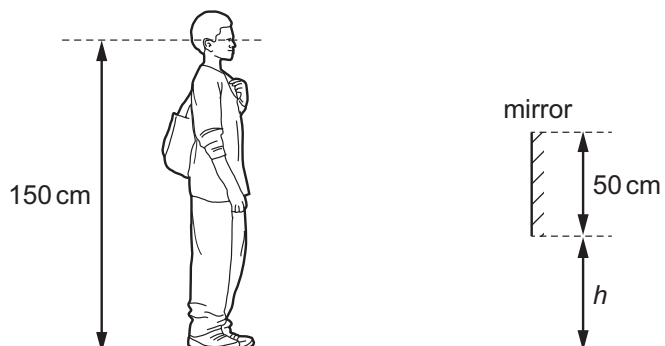
What is the angle of refraction inside the block?

- A 23°
- B 25°
- C 45°
- D 81°

5054/12/O/N/13/Q24

- 70 A shoe shop puts a mirror on the wall so that customers can look at their shoes.

The length of the mirror is 50 cm. A customer has eyes 150 cm above ground level.



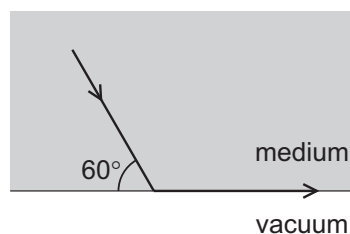
The bottom of the mirror is at height h above the ground.

What is the smallest value of h that allows the customer to see an image of his shoes in the mirror?

- A 0 B 25 cm C 50 cm D 75 cm

5054/11/O/N/14/Q20

- 71 The diagram shows light travelling through a medium. The light reaches the boundary with a vacuum as shown. The light emerges travelling along the surface.

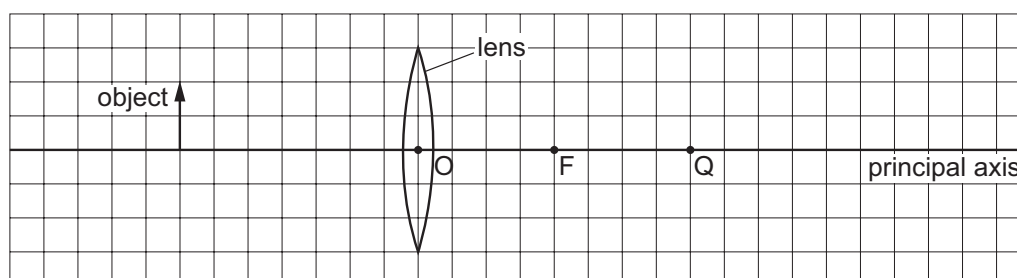


What is the refractive index of the medium?

- A $\frac{\sin 60^\circ}{\sin 30^\circ}$ B $\frac{\sin 60^\circ}{\sin 90^\circ}$ C $\frac{\sin 90^\circ}{\sin 30^\circ}$ D $\frac{\sin 90^\circ}{\sin 60^\circ}$

5054/11/O/N/14/Q21

- 72 The diagram shows an object on the principal axis of a converging (convex) lens. A principal focus of the lens is at F.



Where is the image formed by the lens?

- A between O and F
- B between F and Q
- C at Q
- D to the right of Q

5054/11/O/N/14/Q22

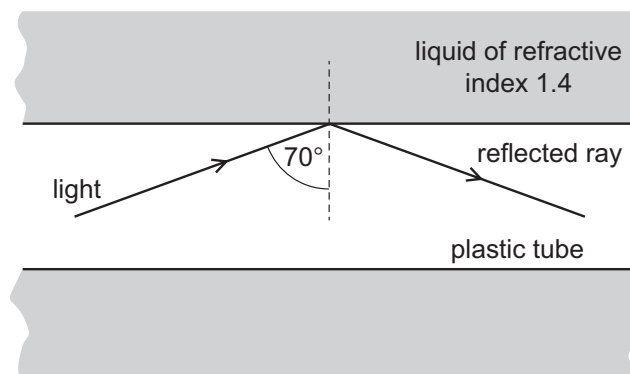
- 73 A digital camera uses a lens to produce a diminished (reduced in size) image on a light sensor.

Which row shows the correct type of lens and the nature of the image?

	type of lens	nature of image
A	converging	inverted
B	converging	upright
C	diverging	inverted
D	diverging	upright

5054/11/O/N/14/Q23

- 74 A plastic tube is immersed in a liquid of refractive index 1.4. Light travelling in the plastic tube strikes the inside surface at an angle of incidence of 70° . The light undergoes total internal reflection.



What describes the values of the critical angle in the plastic and the refractive index of the plastic?

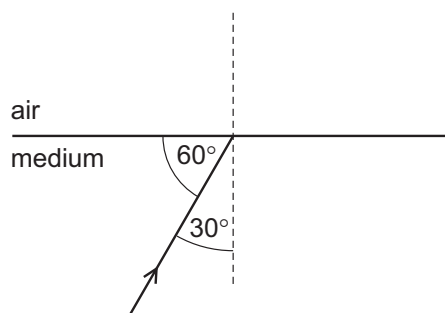
	critical angle in plastic	refractive index of plastic
A	greater than 70°	greater than 1.4
B	greater than 70°	less than 1.4
C	less than 70°	greater than 1.4
D	less than 70°	less than 1.4

5054/12/O/N/14/Q16

- 75 Which statement about red light and blue light is correct?
- A Red light has a higher frequency than blue light.
 - B Red light has a longer wavelength than blue light.
 - C Red light has the same speed in glass as blue light.
 - D Red light is refracted by a glass prism more than blue light.

5054/11/O/N/15/Q20

- 76 A ray of light in a transparent medium of refractive index 1.8 is incident on the surface as shown. The light enters air.



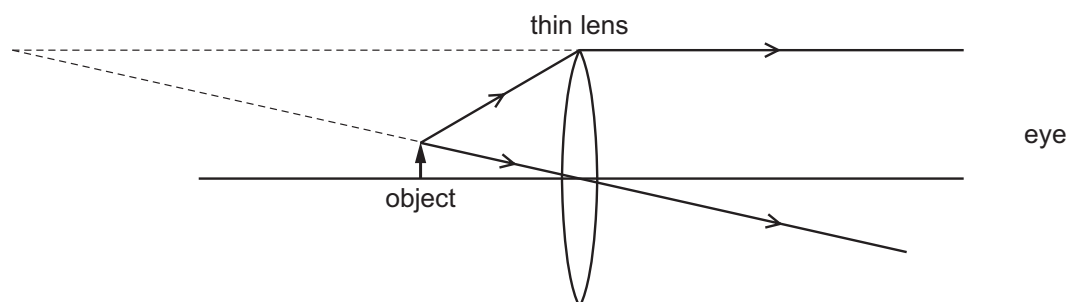
What is the angle between the refracted ray and the normal in air?

- A 29° B 33° C 54° D 64°

5054/11/O/N/15/Q21

- 77 An object is viewed through a converging lens.

The diagram shows the paths of two rays from the top of the object to an eye.

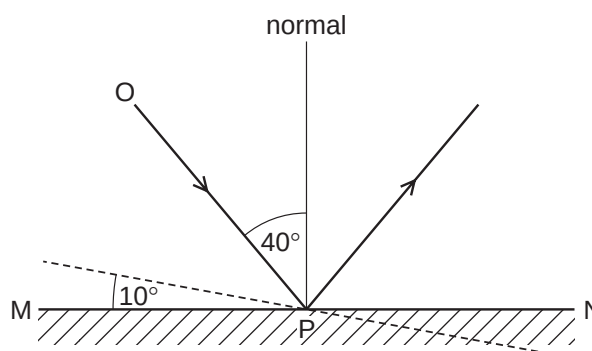


How does the image compare with the object?

- A It is larger and inverted.
B It is larger and upright.
C It is smaller and inverted.
D It is smaller and upright.

5054/12/O/N/15/Q22

- 78 The angle of incidence of ray OP on the plane mirror MN is 40° .



The mirror is rotated through 10° , as shown by the dashed line. The direction of the incident ray OP does not change.

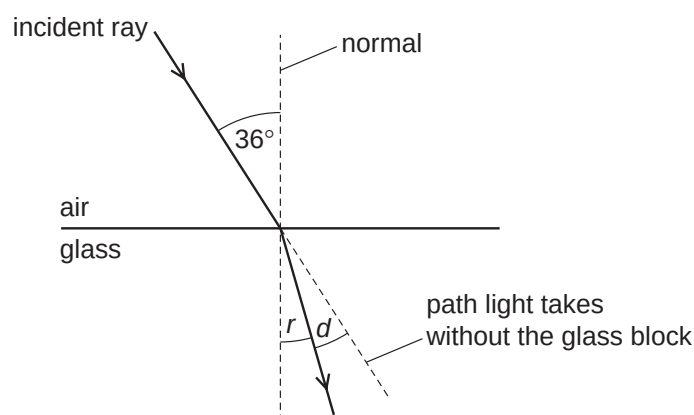
What is the new angle of incidence?

- A** 30° **B** 40° **C** 50° **D** 60°

5054/11/O/N/16/Q23

- 79 A ray of light is incident on the surface of a glass block. The diagram is not drawn to scale.

The refractive index of the glass is 1.5.



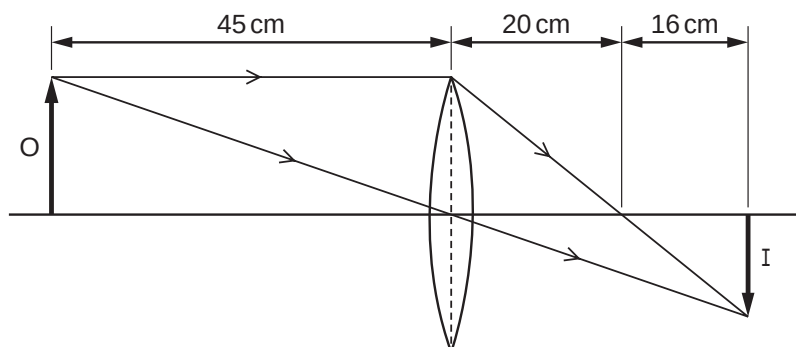
The angle of refraction is r . The angle between the refracted ray and the path the light takes without the glass block is d .

What are r and d ?

	$r/^\circ$	$d/^\circ$
A	23	12
B	24	12
C	23	13
D	24	13

5054/11/O/N/16/Q24

- 80 In the diagram, a convex lens forms an image I of an object O. The diagram is not drawn to scale.

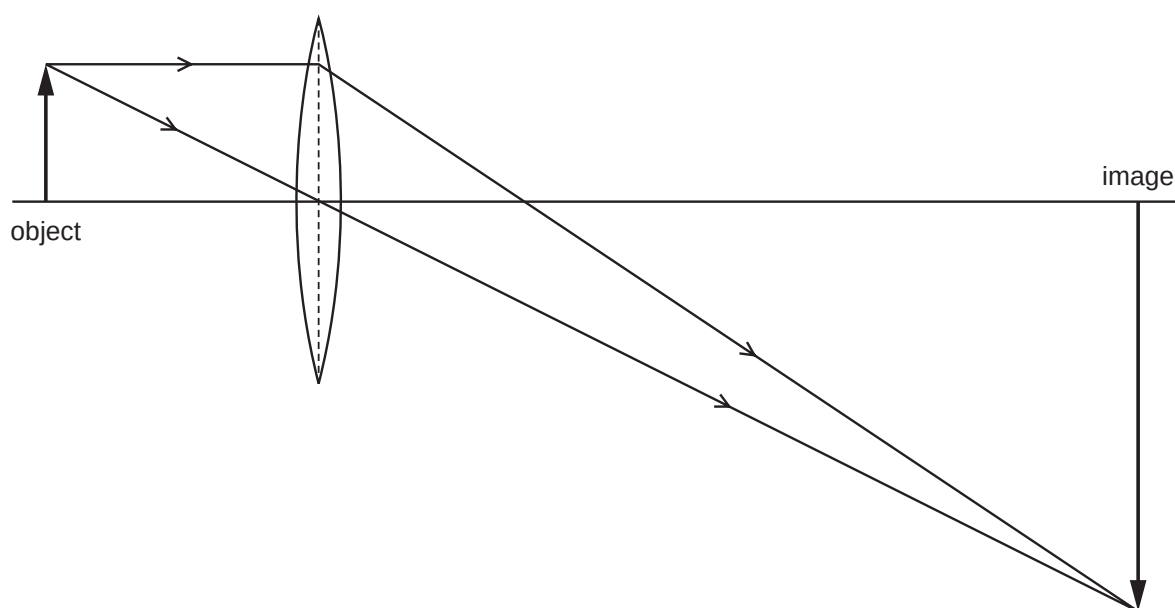


What is the focal length of the lens?

- A 16 cm B 20 cm C 36 cm D 45 cm

5054/11/O/N/16/Q25

- 81 A lens is used to produce a magnified image, as shown in the scale diagram.



What is the linear magnification produced by the lens?

- A 0.33 B 3.0 C 4.0 D 6.0

5054/11/O/N/16/Q26

82 Blue and yellow are colours in the visible spectrum.

Which colour has the lower frequency and which colour has the longer wavelength?

	lower frequency	longer wavelength
A	blue	blue
B	blue	yellow
C	yellow	blue
D	yellow	yellow

5054/11/O/N/16/Q27

83 What is the name and shape of the lens used to correct short sight?

	name of lens	shape of lens
A	converging	
B	converging	
C	diverging	
D	diverging	

5054/11/O/N/17/Q21

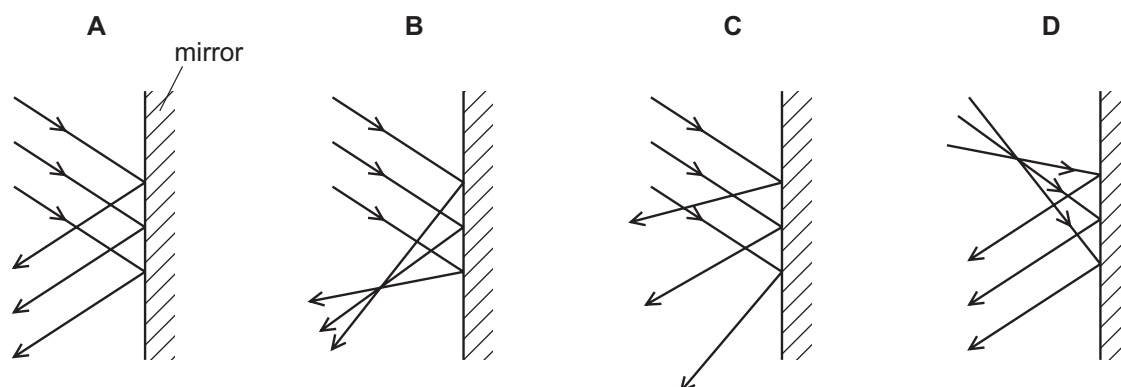
84 An object is placed in front of a converging lens. The lens forms a magnified image of the object on a screen.

Which statement is correct?

- A** The distance between the object and the lens is greater than the focal length.
- B** The image formed is a virtual image.
- C** The image is the right way up.
- D** The lens is acting as a magnifying glass.

5054/11/O/N/17/Q22

85 Which diagram shows reflection by a plane mirror?



5054/12/O/N/17/Q20

86 Light is incident on a plastic block of refractive index 1.5.

The angle of incidence is 50° .

What is the angle of refraction?

A 31°

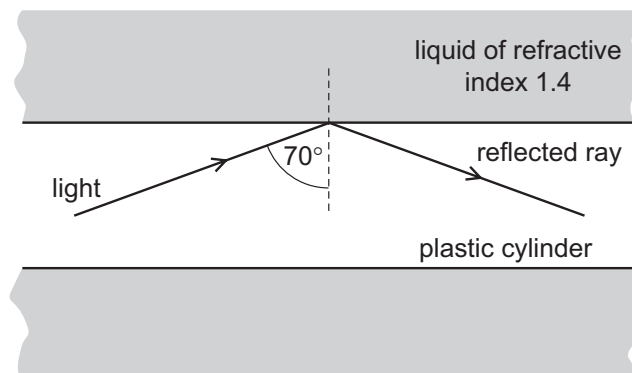
B 33°

C 40°

D 75°

5054/12/O/N/17/Q21

- 87 A solid plastic cylinder is immersed in a liquid of refractive index 1.4. Light travelling in the plastic cylinder strikes the inside surface at an angle of incidence of 70° . The light undergoes total internal reflection.

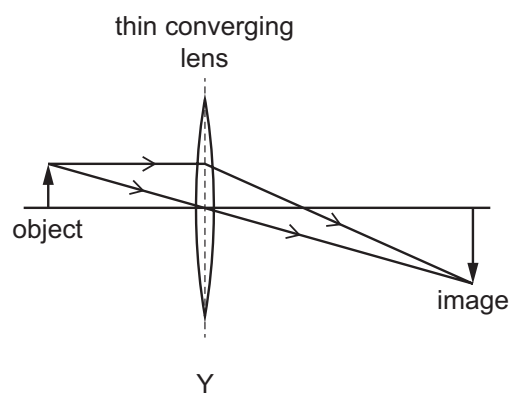
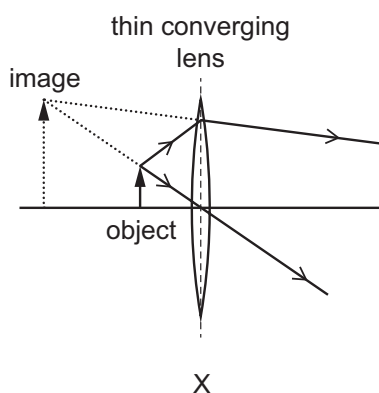


What are the values of the critical angle in the plastic and the refractive index of the plastic?

	critical angle in plastic	refractive index of plastic
A	greater than 70°	greater than 1.4
B	greater than 70°	less than 1.4
C	less than 70°	greater than 1.4
D	less than 70°	less than 1.4

5054/12/O/N/17/Q22

- 88 The ray diagrams, X and Y, show two ways in which a thin converging lens produces an image that is larger than the object.



Which devices use a lens as shown in diagram X and in diagram Y?

	X	Y
A	camera	magnifying glass
B	magnifying glass	projector
C	photographic enlarger	camera
D	photographic enlarger	projector

5054/12/O/N/17/Q23

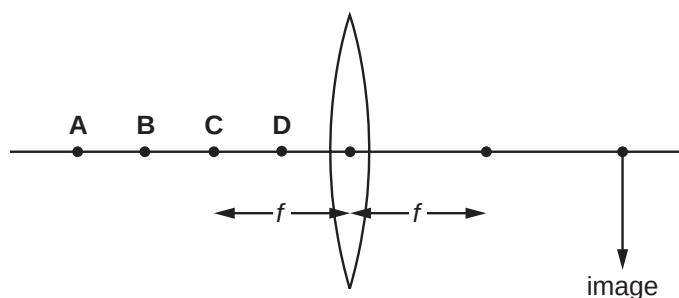
- 89 White light is dispersed by a prism. Compared with blue light, the **red** light is

- A slowed down less and refracted less.
- B slowed down less and refracted more.
- C slowed down more and refracted less.
- D slowed down more and refracted more.

5054/11/O/N/18/Q20

- 90 The diagram shows a thin converging lens of focal length f .

Where must an object be placed to produce a real image in the position shown?



5054/12/O/N/18/Q23

- 91 A student reads the following in her physics book.

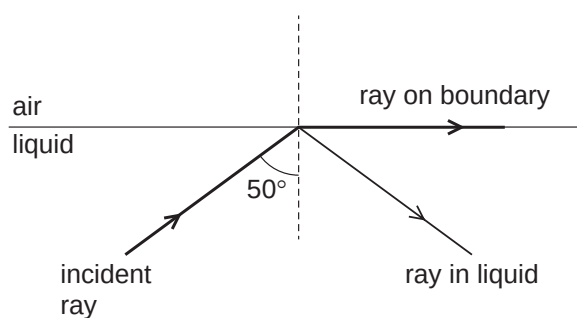
'The incident angle is greater than 42° which is the critical angle for glass in air.'

What is the student reading about?

- A focal length of a glass lens
- B reflection in a plane mirror
- C refraction as light enters glass
- D total internal reflection

5054/12/O/N/18/Q25

- 92 The diagram shows a ray of light in liquid incident on the boundary with air. Two other rays are observed. One is in the liquid and the other is in the air on the boundary.

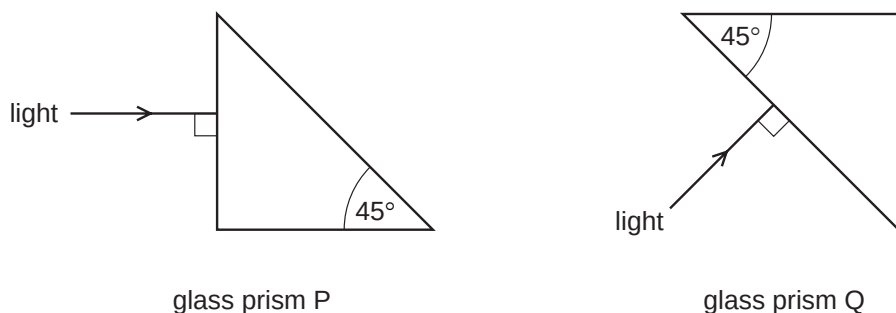


What is the angle of refraction?

- A 0°
- B 40°
- C 50°
- D 90°

5054/11/O/N/19/Q26

- 93 Light is incident at 90° on the surfaces of two glass prisms P and Q.



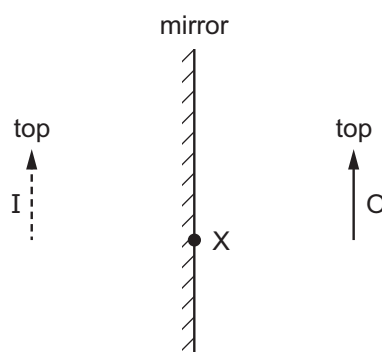
The critical angle for light travelling from glass into air is 42° .

Where does total internal reflection occur?

- A in P and in Q
- B in P only
- C in Q only
- D in neither P nor Q

5054/11/O/N/19/Q27

- 94 An object O is placed in front of a plane mirror. I is the image formed.



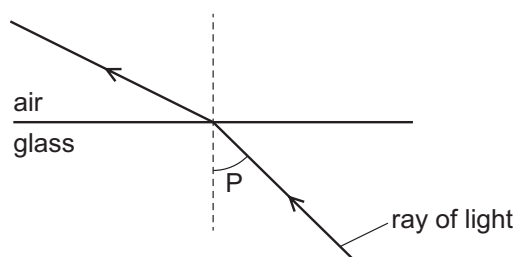
A ray from the top of the object is incident on the mirror at X.

What happens to this ray?

- A It reflects and passes through the bottom of O.
- B It reflects and passes through the top of O.
- C It reflects as though it came from the bottom of I.
- D It reflects as though it came from the top of I.

5054/12/O/N/19/Q24

95 The diagram shows light passing from glass into air.



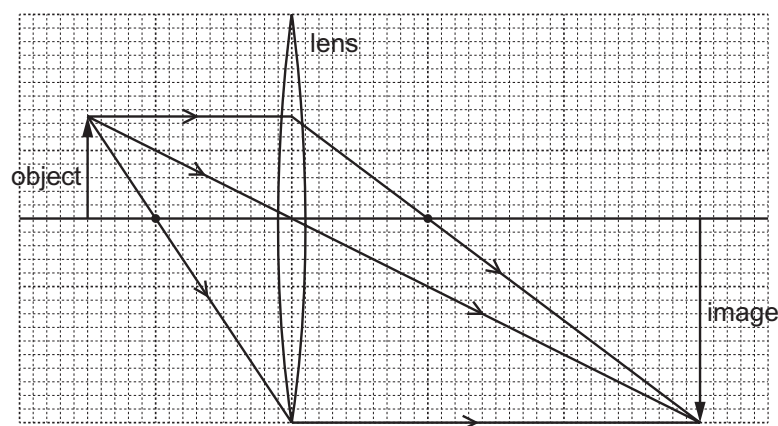
What is the name of angle P?

- A the angle of incidence
- B the angle of reflection
- C the angle of refraction
- D the critical angle

5054/12/O/N/19/Q25

96 An object is placed in front of a converging lens of focal length 4.0 cm. The height of the image is 6.0 cm.

The arrangement is shown on the scale diagram.

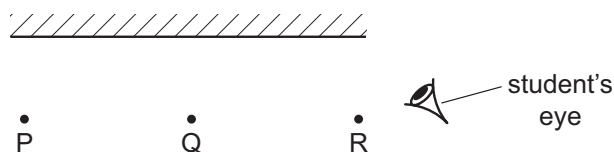


What is the linear magnification produced by the lens?

- A 0.50
- B 1.5
- C 2.0
- D 6.0

5054/12/O/N/19/Q26

- 97 Three objects P, Q and R are placed in front of a plane mirror.



The student's eye is positioned as shown.

Which of the images of P, Q and R can the student see in the mirror?

	P	Q	R
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✗
D	✗	✗	✗

key

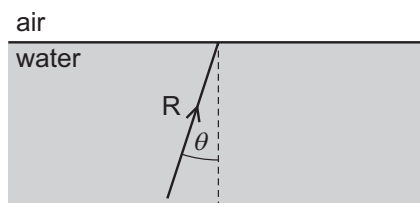
✓ = can see

✗ = cannot see

5054/11/O/N/20/Q27

- 98 A ray of light R is incident on a water-to-air surface with an angle of incidence θ .

The angle θ is less than the critical angle c .

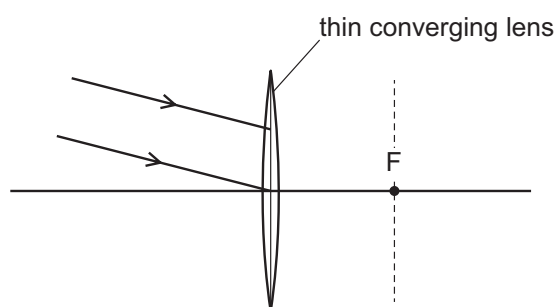


Which statement describes the subsequent path of R?

- A It travels back into the water with an angle of reflection equal to c .
- B It travels back into the water with an angle of reflection greater than c .
- C It travels into air with an angle of refraction greater than θ .
- D It travels into air with an angle of refraction smaller than θ .

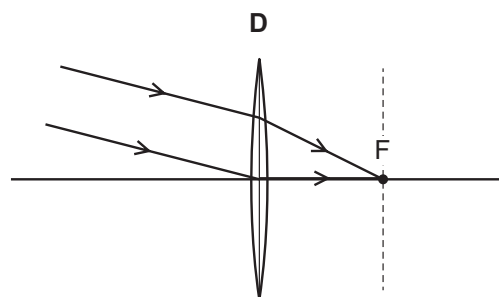
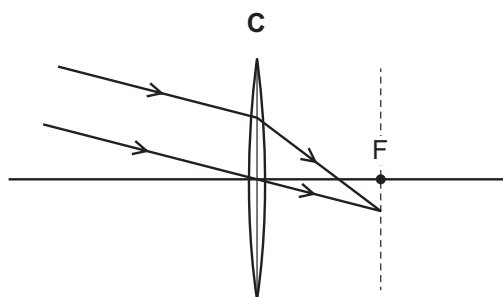
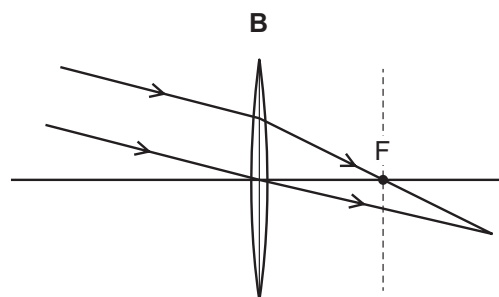
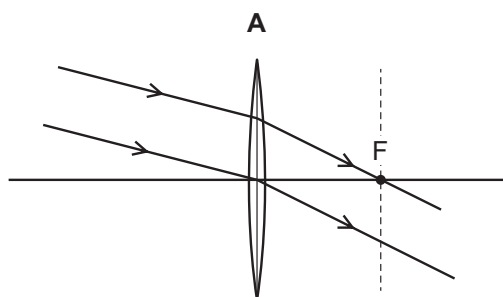
5054/11/O/N/20/Q28

- 99 A parallel beam of light is incident on a thin converging lens.



F is one focal point of the lens.

Which ray diagram shows the light after it has passed through the lens?



5054/11/O/N/20/Q29

100 A plane mirror on a vertical wall forms an image of an object placed in front of it.

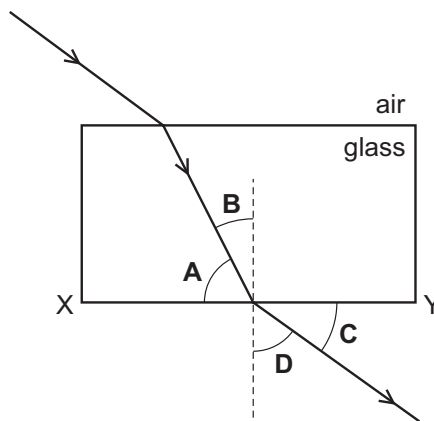
Which characteristics describe the image?

- A** real, inverted and smaller than the object
- B** real, upright and the same size as the object
- C** virtual, upright and smaller than the object
- D** virtual, upright and the same size as the object

5054/12/O/N/20/Q23

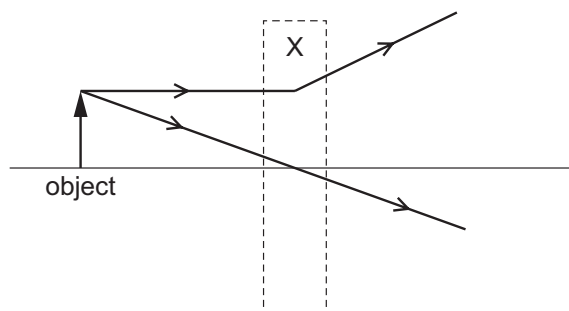
101 A ray of light passes into a glass block. It travels through the glass block and then emerges into the air.

Which angle is the angle of refraction at the surface XY?



5054/11/O/N/21/Q20

102 Two rays of light pass through a lens in region X.



Which type of lens is in region X and which type of image is formed?

	type of lens	type of image
A	converging	real
B	converging	virtual
C	diverging	real
D	diverging	virtual

5054/11/O/N/21/Q21

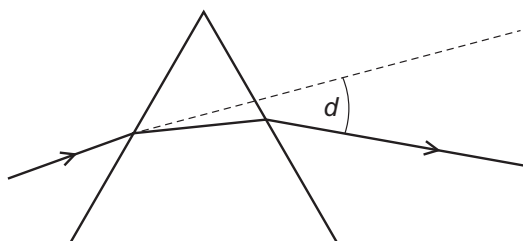
103 A girl is long-sighted.

Which statement is correct?

- A** She sees close objects less clearly than a person with normal vision.
- B** She sees distant objects more clearly than a person with normal vision.
- C** The fault is corrected with a diverging lens.
- D** The image of a close object is formed in front of her retina.

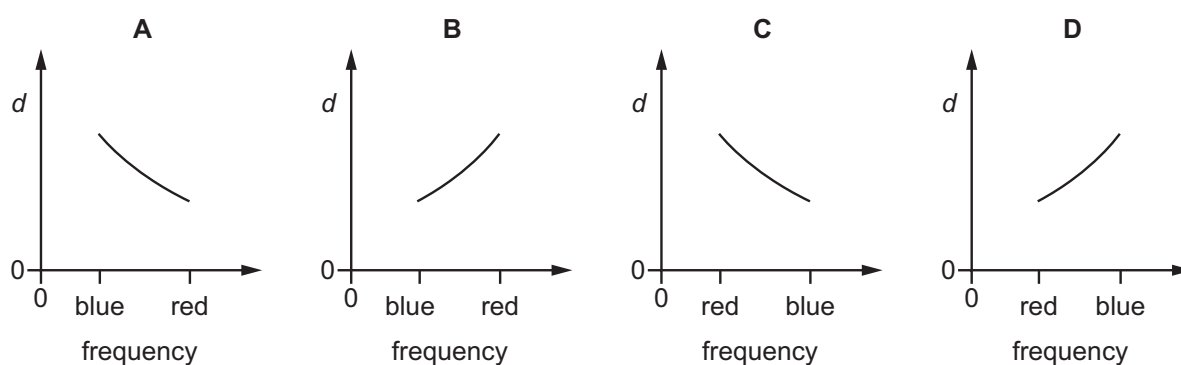
5054/11/O/N/21/Q22

104 Light rays are deviated by a prism.



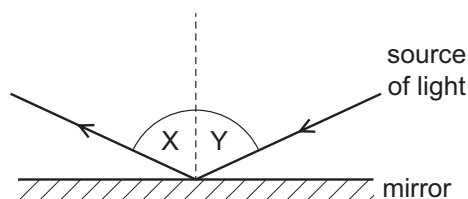
The deviation angle d is measured for light rays of different frequency, including blue light and red light.

Which graph of d against frequency is correct?



5054/11/O/N/21/Q23

105 Light reflects from a plane mirror as shown.

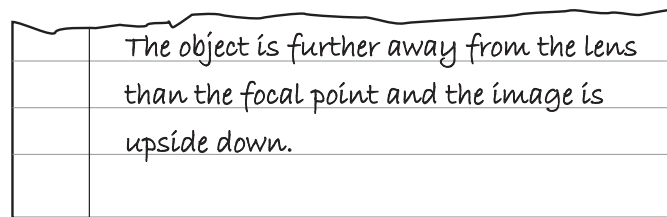


Which row is always correct?

	symbol of angle X	relationship between X and Y
A	i	$X = Y$
B	i	$X + Y = 90^\circ$
C	r	$X = Y$
D	r	$X + Y = 90^\circ$

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- 106 A piece of paper torn from an exercise book is shown.



Which process is being described?

- A the formation of a virtual image by a diverging lens
- B the formation of a virtual image by a converging lens
- C the formation of a real image by a diverging lens
- D the formation of a real image by a converging lens

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