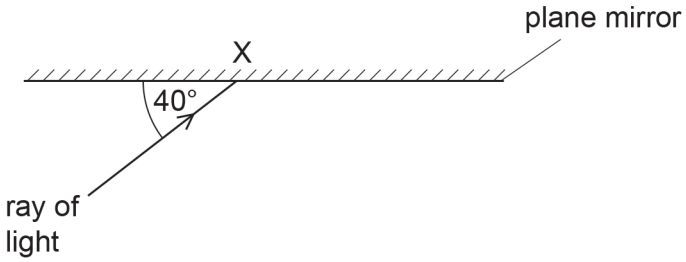
1 The diagram shows a ray of light incident on a plane mirror at point X.



(not to scale)

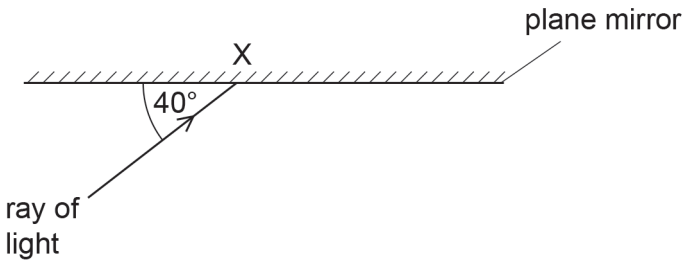
On the diagram:

- draw the normal at point X and label the normal with the letter N
- draw the ray reflected from point X.

[2]

[Total: 2]

2 The diagram shows a ray of light incident on a plane mirror at point X.



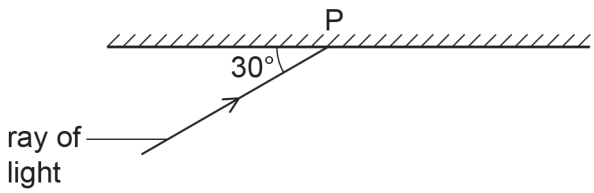
(not to scale)

Determine the value of the angle of reflection for the ray of light at point X.

..... [1]

[Total: 1]

3 The diagram shows a ray of light striking a plane mirror at point P.



(not to scale)

(a) Determine the value of the angle of incidence for the ray of light at point P.

angle of incidence = ...° [1]

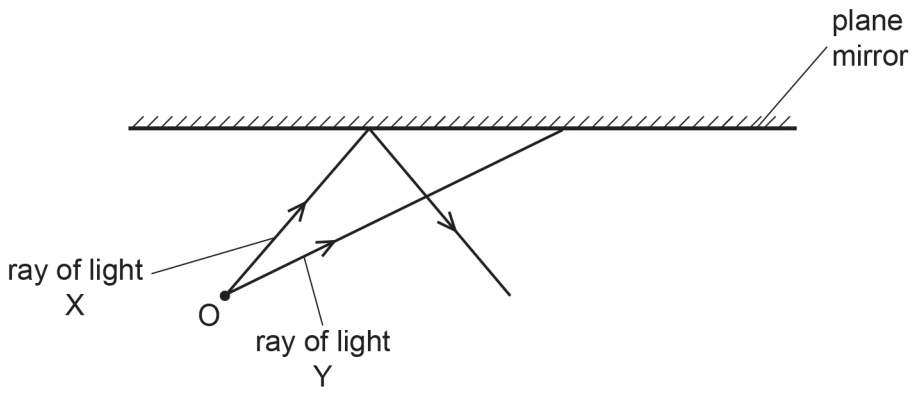
(b) On the diagram,

- draw a normal at point P
- draw the ray reflected at point P
- determine the angle of reflection at point P.

angle of reflection = ...° [3]

[Total: 4]

4 The diagram shows two rays of light X and Y leaving an object O. The rays strike a plane mirror. Ray X is reflected as shown.



(a) On the diagram, draw the normal at the point where ray X strikes the mirror.

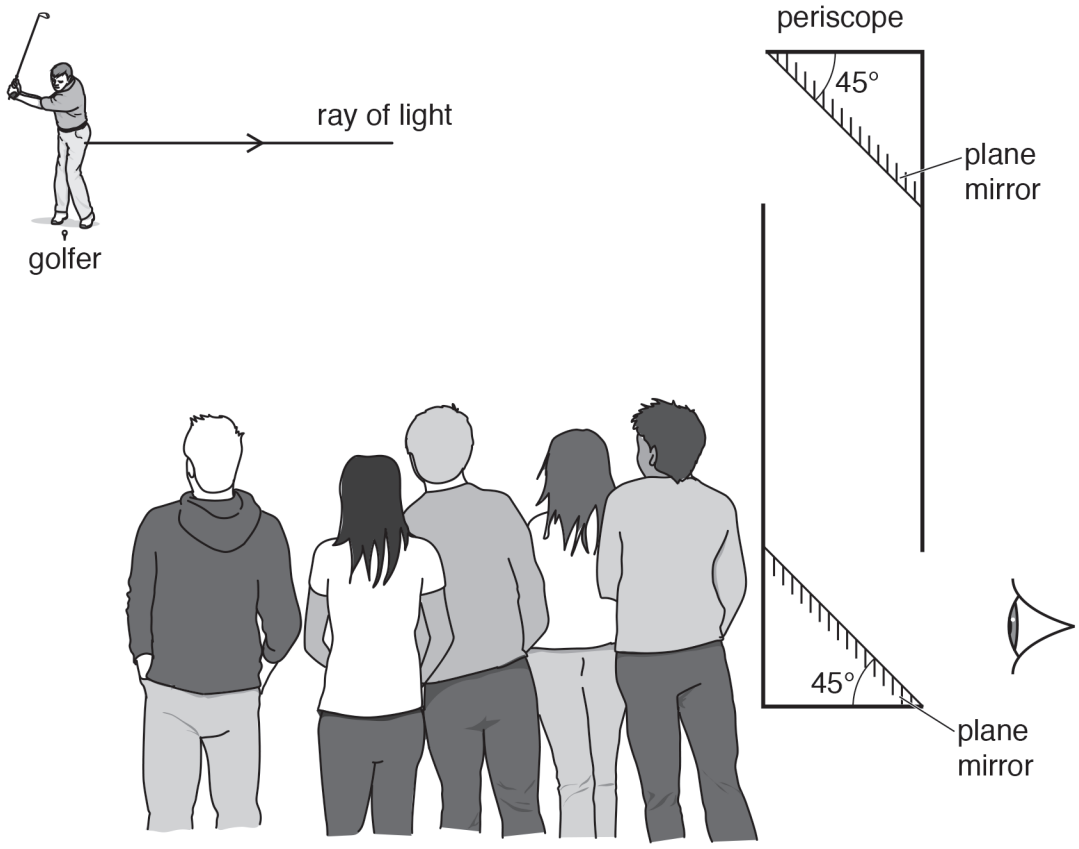
[1]

(b) On the diagram, draw the path of ray Y after it strikes the mirror.

[1]

[Total: 2]

5 The diagram shows a mirror periscope. The periscope is used to view a golfer over the heads of other people. The periscope has two plane mirrors each at an angle of 45° to the vertical.



(not to scale)

(a) On the diagram:

1. Continue the ray of light from the golfer towards the upper mirror of the periscope.

2. Draw and label the normal at the point where the ray strikes the mirror.

[1]

(b) On the diagram, continue the ray of light after reflection at the upper mirror until it leaves the periscope.

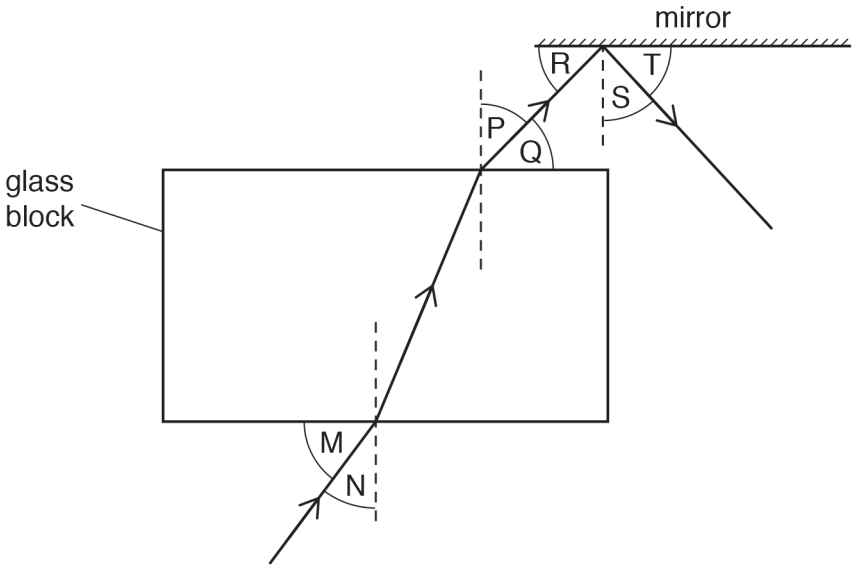
[1]

(c) State the law of reflection used to deduce the position of the ray of light after striking the mirrors.

..... [1]

[Total: 3]

6 The diagram shows a ray of light travelling through a glass block and then reflecting from a mirror.



Use the diagram to identify the three angles in the list. Place the correct letter in the box to indicate each angle.

☐ angle of incidence

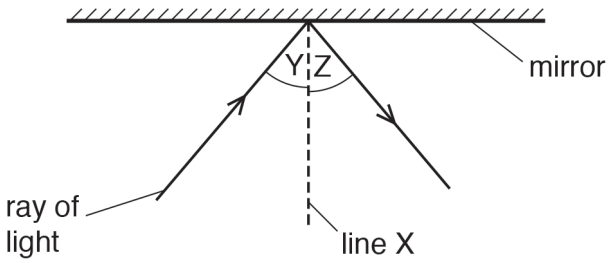
☐ angle of reflection

☐ angle of refraction

[3]

[Total: 3]

7 The diagram shows a ray of light that is reflected by a mirror.



(a) State the name of line X shown on the diagram.

..... [1]

(b) State the name of angle Y shown on the diagram.

..... [1]

(c) A student moves the ray of light and doubles the size of angle Y. State the effect on angle Z.

..... [1]

[Total: 3]

8 A ray of light in air is incident on a glass block. The light changes direction.

State

(a) the name of this effect,

..... [1]

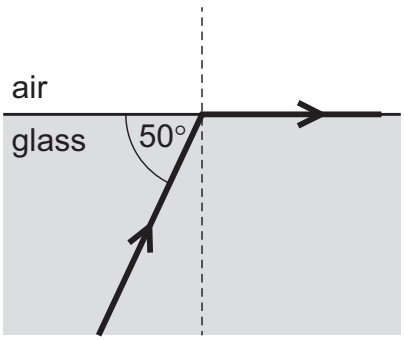
(b) the cause of this effect.

..... [1]

[Total: 2]

9 The diagram shows a ray of light in glass. The ray reaches a boundary with air.

One weak ray of light is missing from the diagram.



Which statement is correct?

A At the boundary, the speed of the light will become less.

B The critical angle for light at this boundary is 50°.

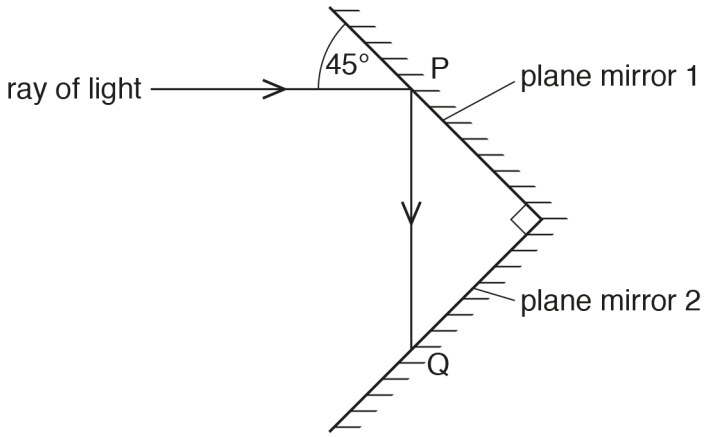
C The diagram shows an example of diffraction of light.

D The missing ray is a weak reflected ray.

[1]

[Total: 1]

10 The diagram shows a ray of light reflected from mirror 1 at point P and striking mirror 2 at point Q.



(a) On the diagram,

- clearly mark the position of the normal at Q,
- draw the ray reflected from point Q,
- mark the angle of reflection at Q using the letter *r*,

State the law you used to draw the reflected ray.

..... [4]

(b) Compare the direction of the ray reflected from mirror 2 at Q with the direction of the ray incident on mirror 1 at P. Tick **one** box.

The ray of light reflected from mirror 2 is

☐ parallel to the incident ray at P,

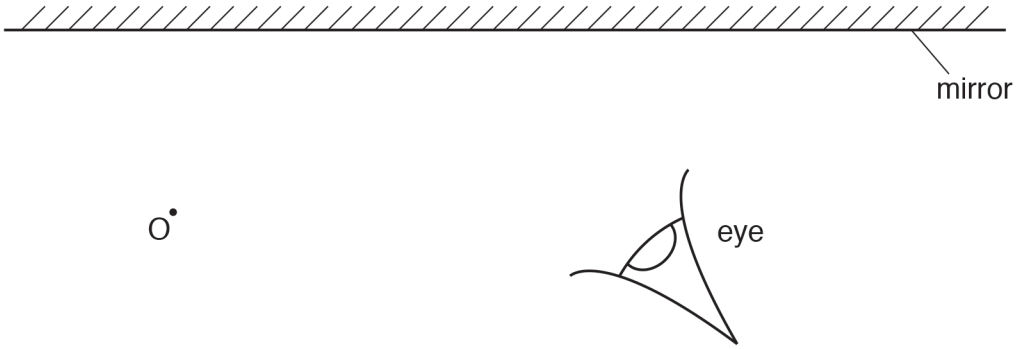
☐ perpendicular to the incident ray at P,

☐ at an angle of 45° to the incident ray at P.

[1]

[Total: 5]

11 The diagram shows a plane mirror, a point object O and an observer's eye.



(a) On the diagram, draw **two** rays from the object reflected to the observer's eye.

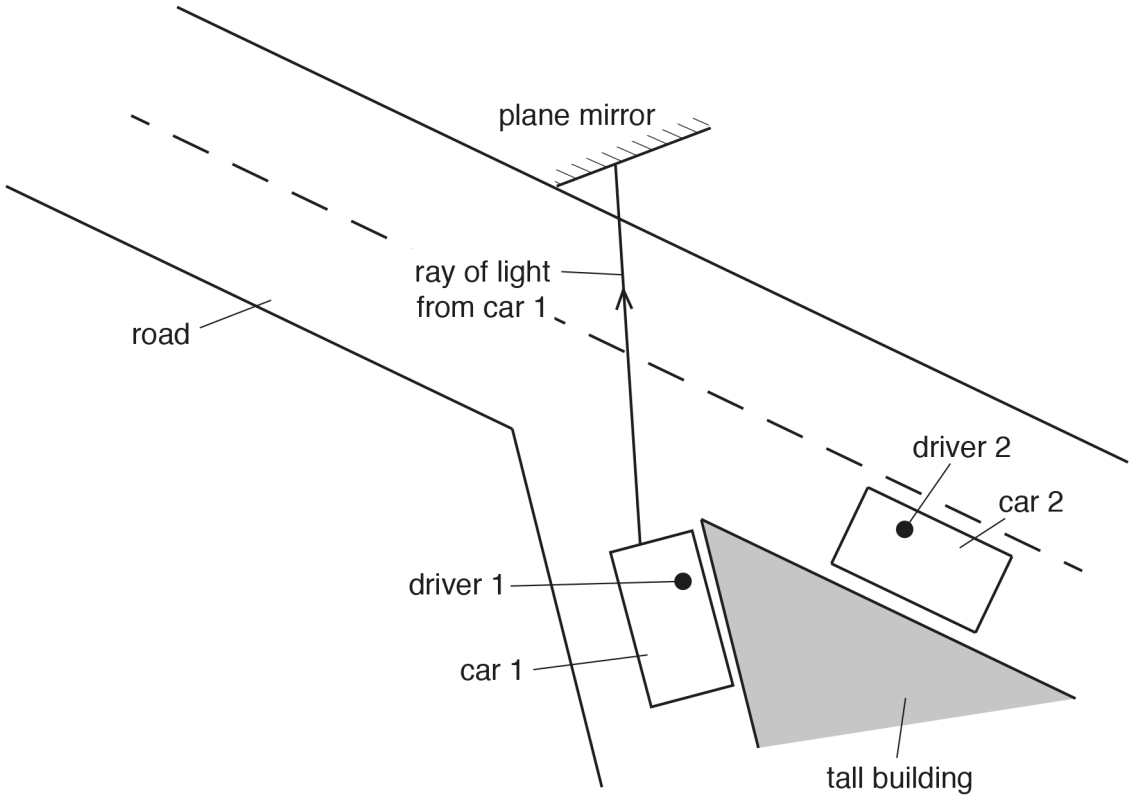
[2]

(b) On the diagram, complete your drawing to determine the position of the image of the object O.
Label this image I.

[2]

[Total: 4]

12 The diagram shows an overhead view of two cars approaching a road junction. A plane mirror helps the drivers to see other cars.



(a) A ray of light from car 1 is shown.

On the diagram, clearly draw the normal to the plane mirror where this ray hits the plane mirror. Label the normal N.

[1]

(b) On the diagram, carefully draw the reflected ray of light.

[1]

(c) State the law used in your answer to **(b)**.

..... [1]

(d) Can each driver see the other car?

.....

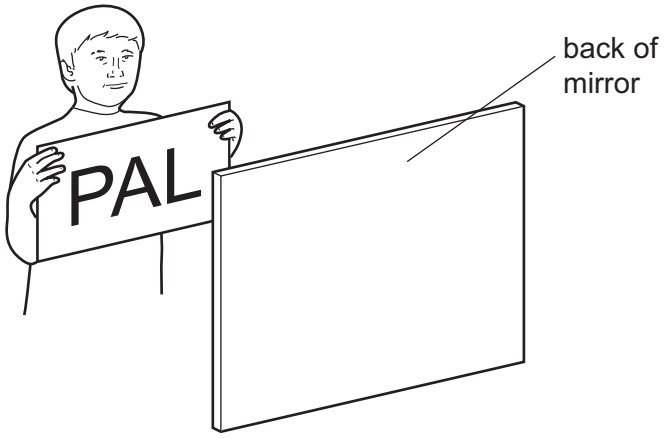
Explain your answer.

..... [1]

[Total: 4]

13 A piece of paper has 'PAL' written on it.

A student holds the paper in front of a plane mirror.



What does the student see?

A

B

C

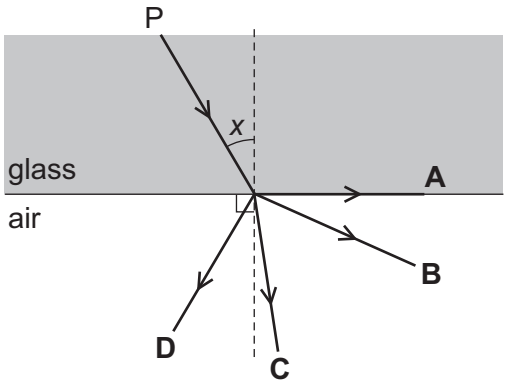
D

[1]

[Total: 1]

14 The diagram shows a ray of light travelling from P. Angle *x* is less than the critical angle.

In which labelled direction does the ray continue?



[1]

[Total: 1]