STARTER

78 - 36	18 x 23
Work out 10% of 20	125 ÷ 5
Mollie watches a film that lasts 130 minutes. It begins at 6:15pm. What time does it end?	
In a class there are 12 girls and 18 boys. What fraction of the class are girls?	

Geometric shapes

Learning Objectives

- Draw 2-D shapes and demonstrate an understanding of line symmetry and knowledge of the relevant size of angles
- Interpret plans, elevations and nets of simple 3-D shapes
- Use angles when describing position and direction, and measure angles in degrees

Recap

1) Calculate 25% of £48
2) Calculate 5% of 320kg
3) Calculate 20% of £755

1) Convert 25mm to cm
2) Convert 2m to cm
3) Calculate 3km to m

2-D and 3-D shapes

2-D shapes are flat – they have 2 dimensions: width and height.

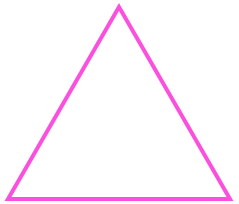
Which 2-D shapes can you draw?

3-D shapes are solid – they have 3 dimensions: width, depth and height.

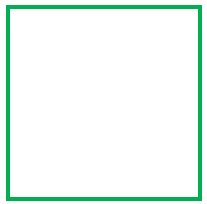
Which 3-D shapes can you draw?

Properties of regular 2-D Shapes

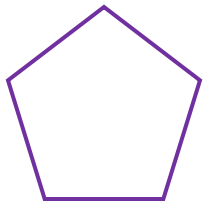
Look at the polygons below and write down their names and their properties.



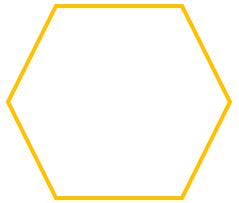
Name……
No. equal sides……
No. equal angles…….



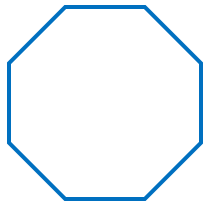
Name……
No. equal sides……
No. right angles……..



Name……
No. equal sides……
No. equal angles……..

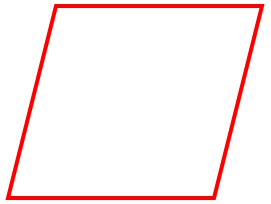


Name……
No. equal sides……
No. equal angles……..



Name……
No. equal sides……..
No. equal angles……..

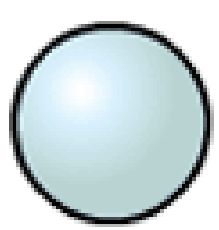
Name:……
No. equal sides:……
No. of pairs of equal angles……..
No. of pairs of parallel sides……



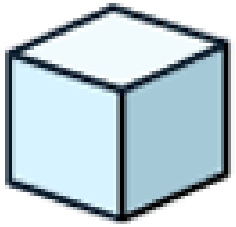
Name……
No. equal sides:……
No. of pairs of equal angles……..
No. of pairs of parallel sides…..

Name:……
No. equal sides:……
No. of pairs of equal angles…….
No. of pairs of parallel sides…..

How many 3D shapes can you name?



1



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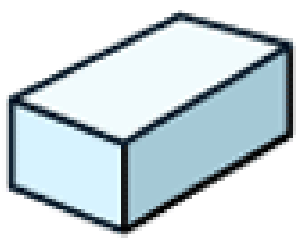
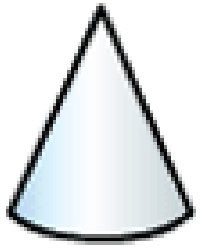
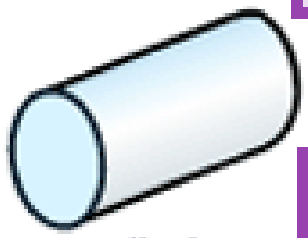


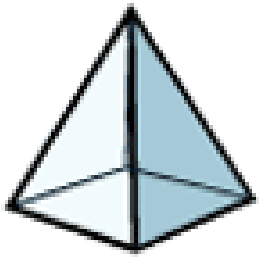
3



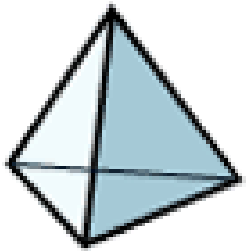
4



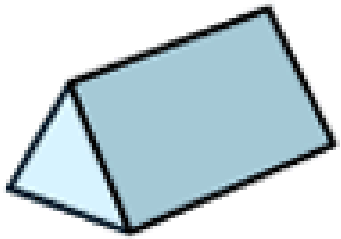
5



6



7



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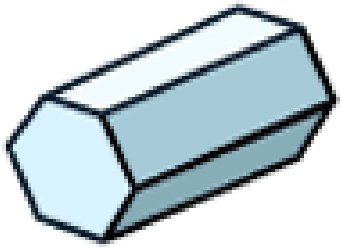


9

Cone

Hexagonal prism

Cube

Triangular based pyramid

Cuboid

Triangular prism

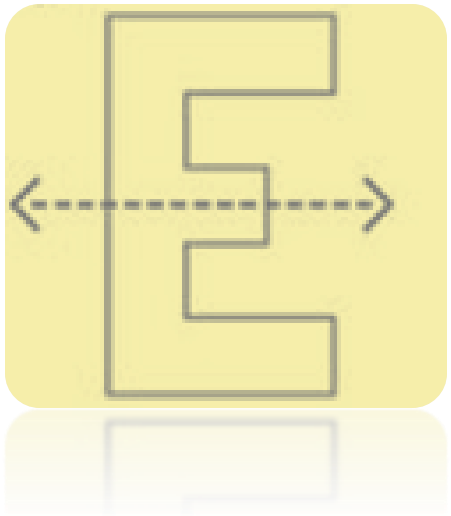
Sphere

Cylinder

Square based pyramid

Symmetry

A shape has a line of symmetry if when folded accurately in half there are no sticking out bits on top or underneath.



How many lines of symmetry do each of these letters have?

a) T

b) H

c) E

d) A

e) D

f) O

g) B

h) Z

i) M

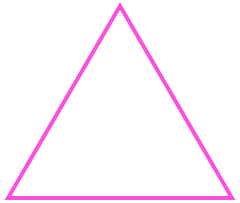
j) S

k) X

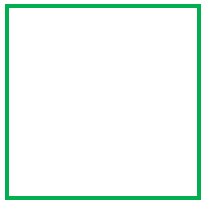
l) V

Investigating lines of symmetry

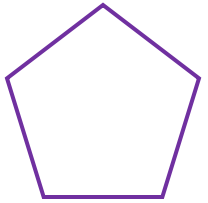
How many lines of symmetry do these 2-D shapes have?



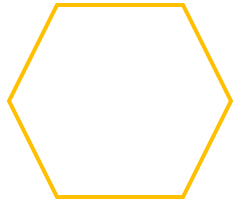
Lines of Symmetry:…….



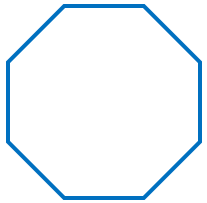
Lines of Symmetry:……..



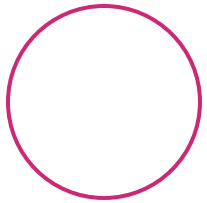
Lines of Symmetry:……..



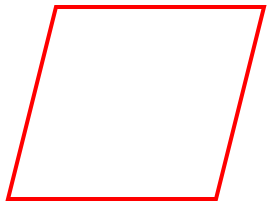
Lines of Symmetry:……..



Lines of Symmetry:……..



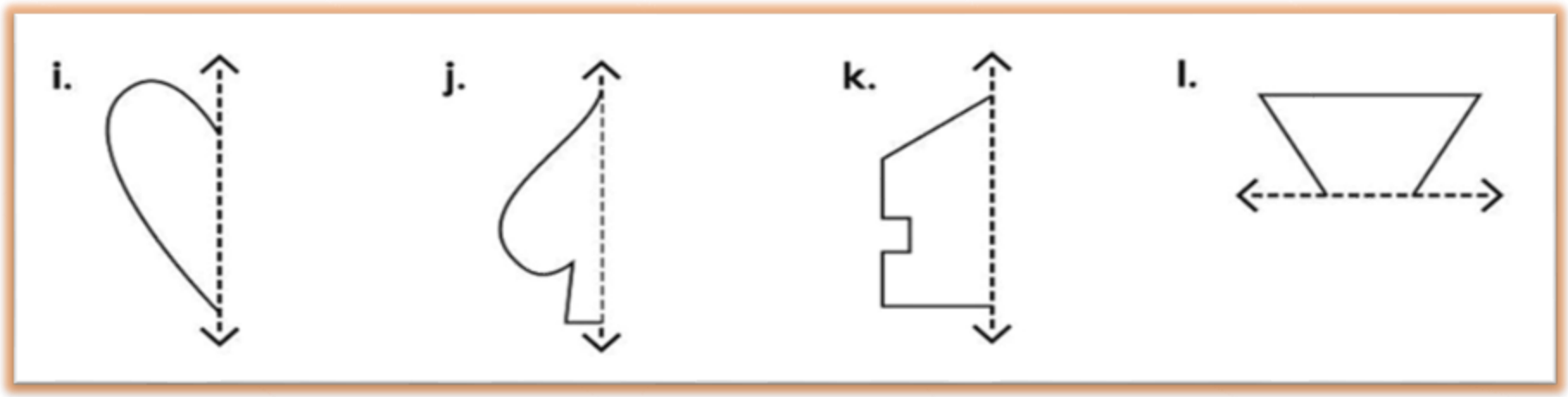
Lines of Symmetry:……..



Lines of Symmetry:……..

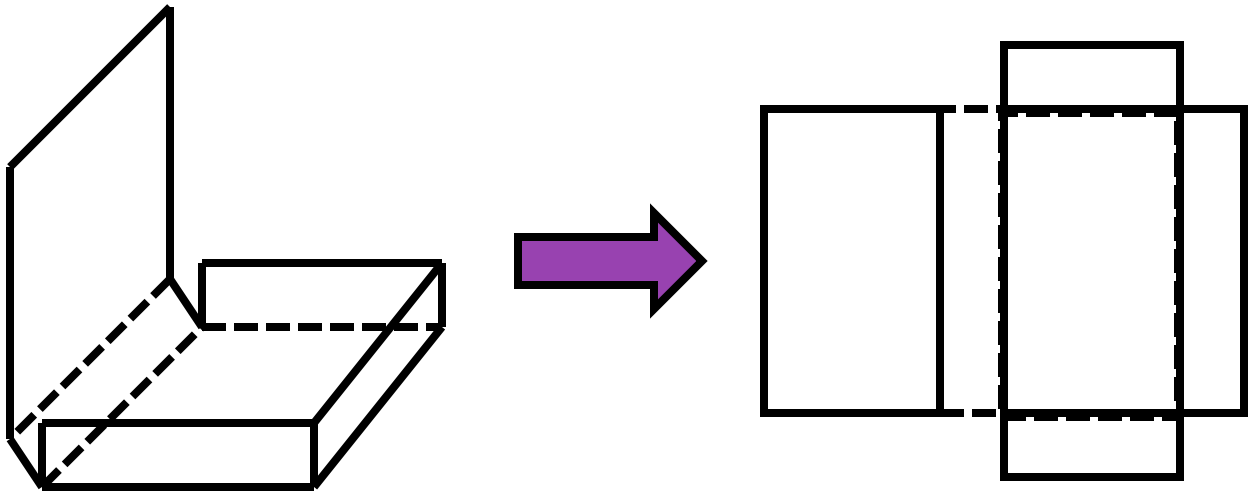
Lines of Symmetry:……..

Draw the second half of each symmetrical shape



3-D nets

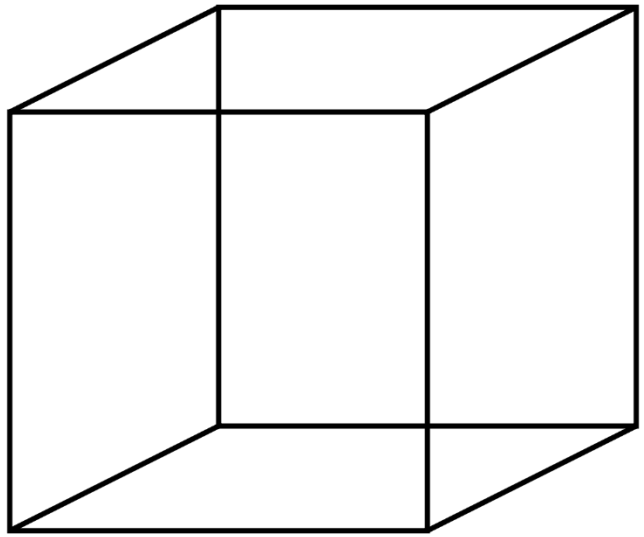
A net is a pattern that you can cut and fold to make a model of a 3D shape.
Have you ever cut open a box?
When you do, you end up with its net.

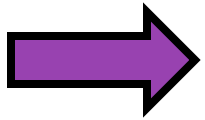


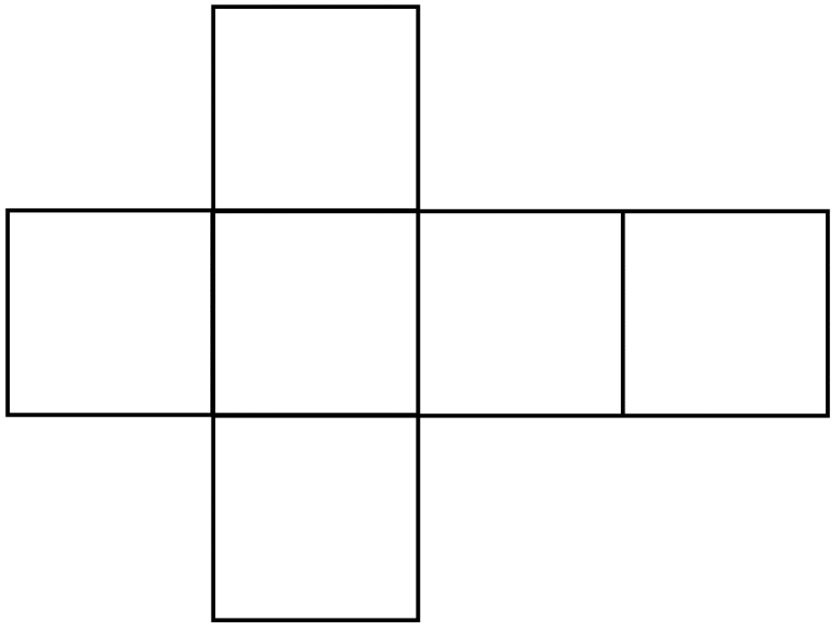
It is a 2D plan of the six faces that join together to form a box.

3-D nets

Can you label and draw this shapes net?

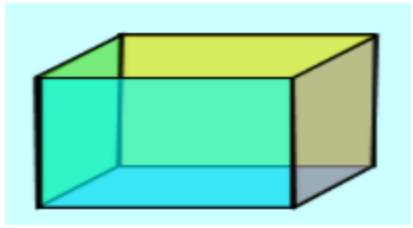




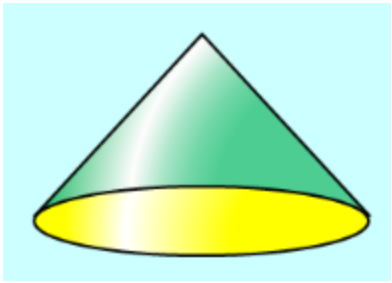


Can you draw the nets of the following 3D Shapes?

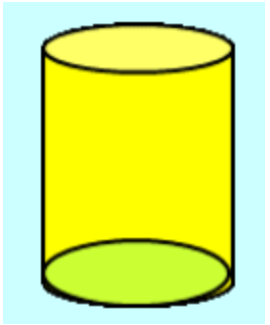
a)



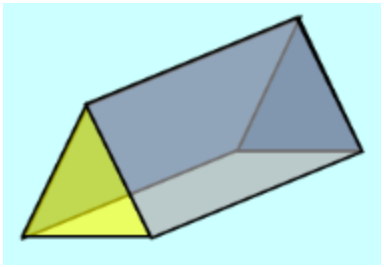
b)



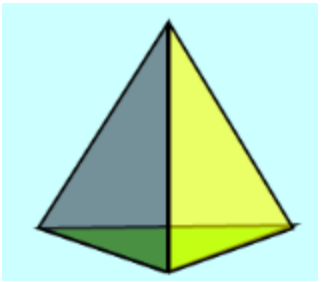
c)



d)

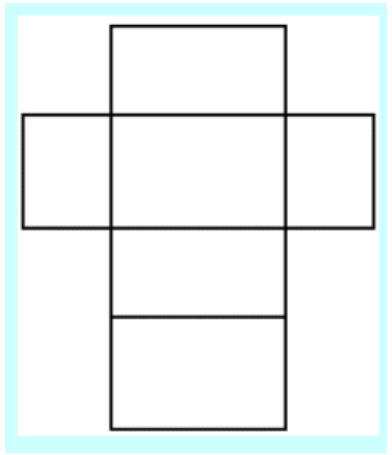


e)

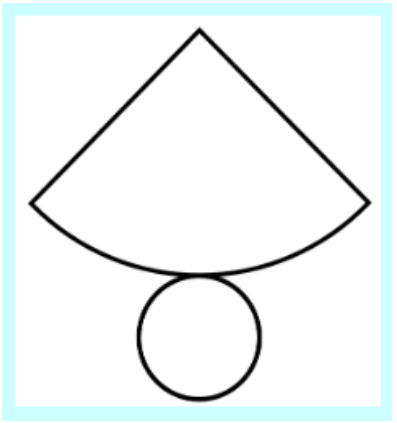


Answers

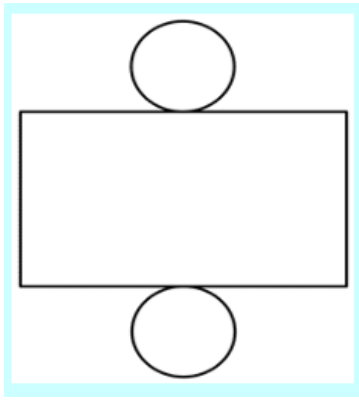
a)



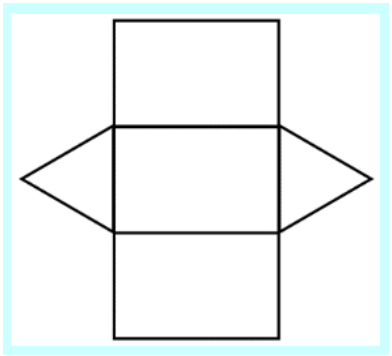
b)



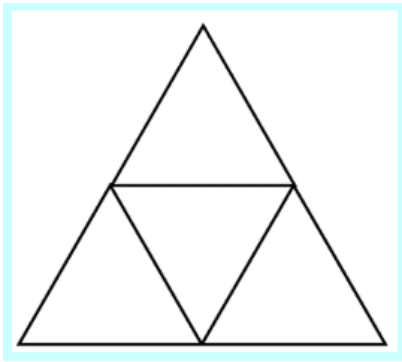
c)



d)



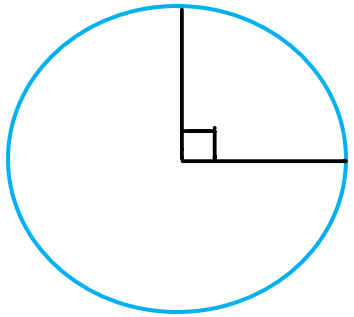
e)



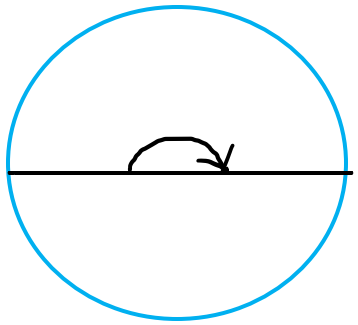
Angles

- A measure of how far something has turned around a fixed point.
- Angles are measured in **degrees** using a **protractor**.

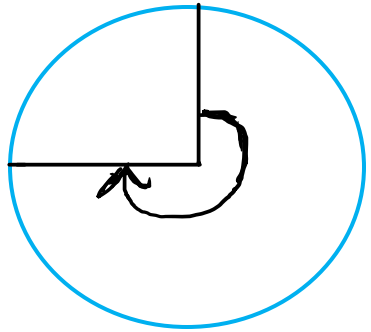
90° (right angle)



180° (straight line)



270° ($^{3}/_{4}$ turn)



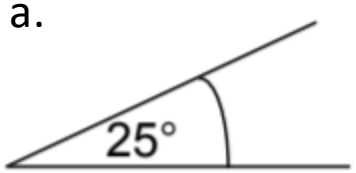
How many degrees are there in a full turn?

Identifying Angles

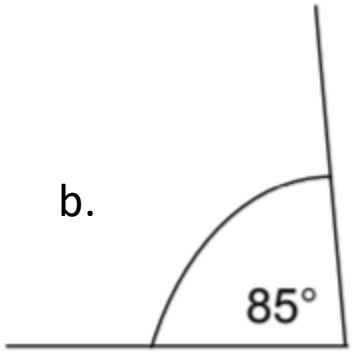
State which of the angles in the drawings are :

- right angles
- acute angles
- obtuse angles
- reflex angles

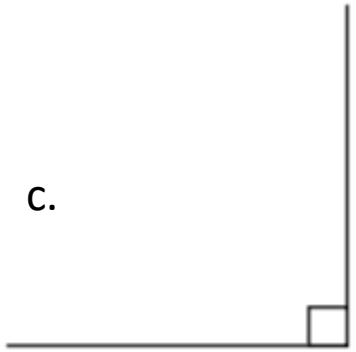
a.



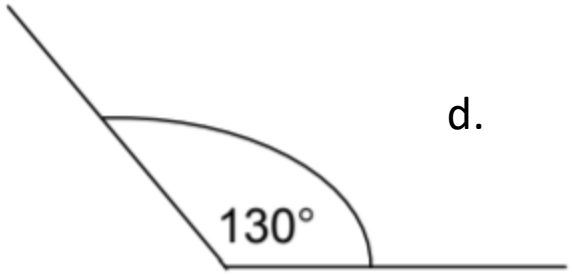
b.



c.

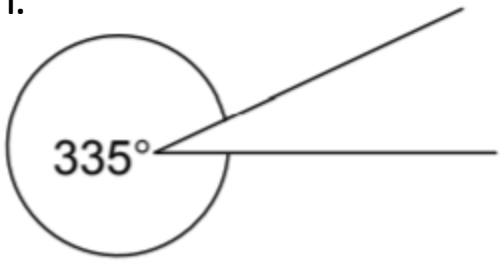


d.

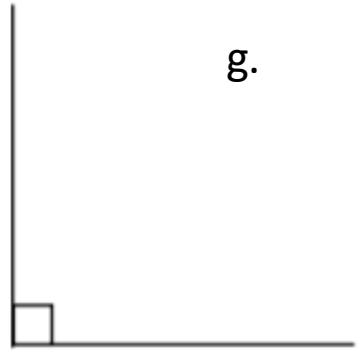


e.

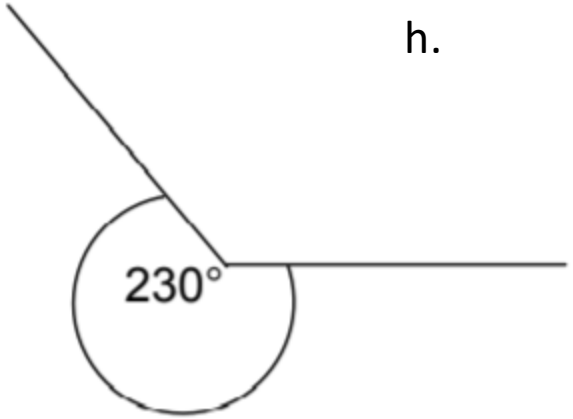
f.



g.

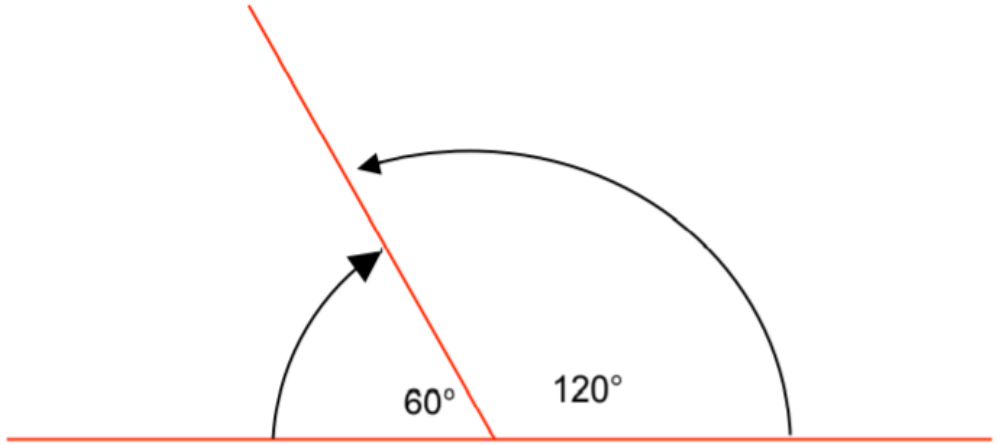


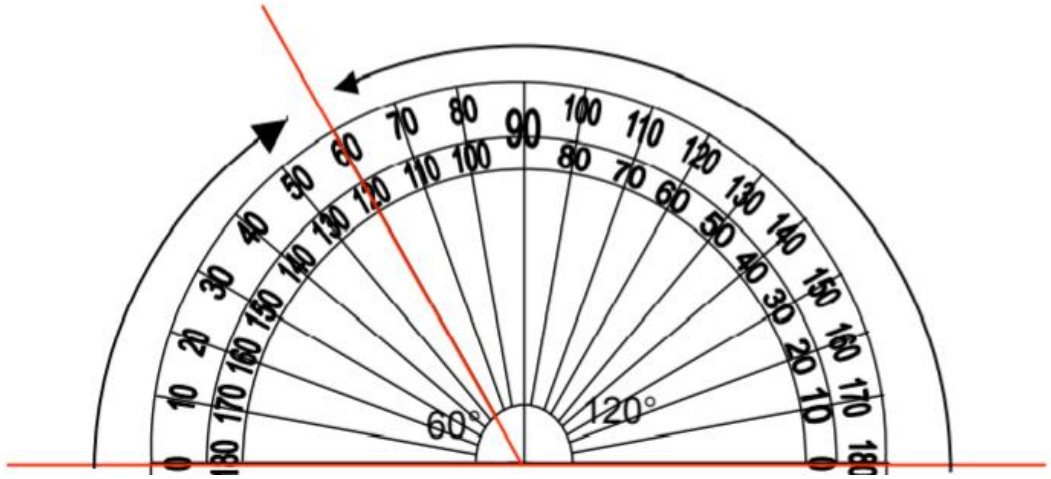
h.



Measuring Angles with a Protractor

A protractor is used to measure angles. It has two sets of numbers going in opposite directions.



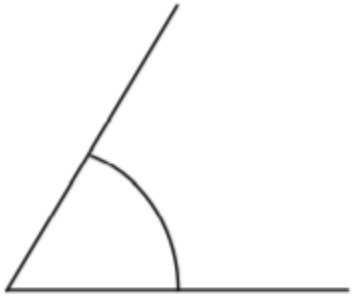


To measure the smaller angle above, start from the 0° on the left and move around clockwise. It measures 60°.

To measure the larger angle, start from 0° on the right and move around anti-clockwise. It measures 120°

Measure and Identify these types of Angle

a.

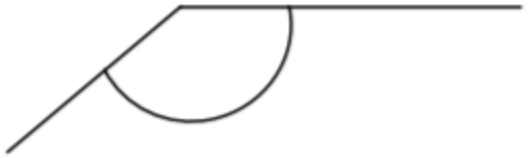


b.

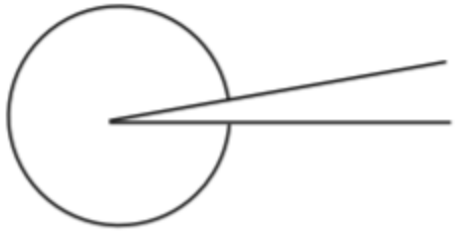
c.

d.

e.



f. Tip: you may want to measure the smaller angle and subtract from a complete turn.



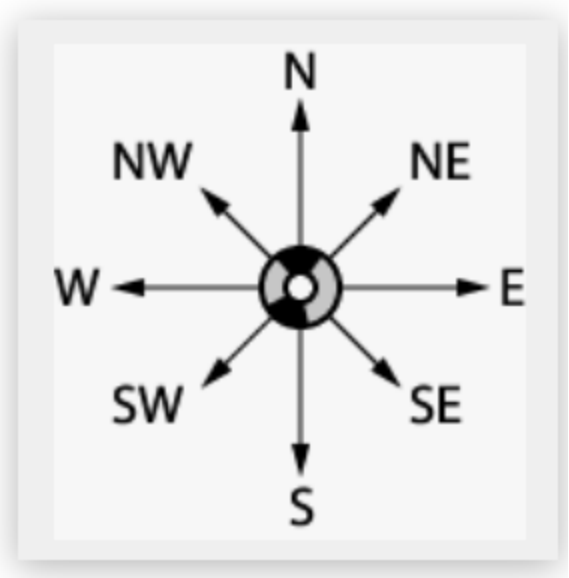
A Compass is used in navigation for showing direction of travel

How many degrees are there between:

a) N and S

b) S and W

c) SW and NE



d) W and NW

e) E and SW

f) NE and S

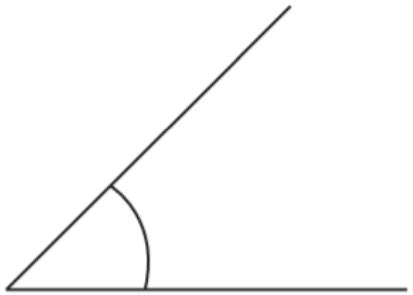
Exam questions

The new office building must have a wheelchair ramp at the front entrance.
The angle between the ramp and ground must be 5°

(b) Which of these angles is 5°?

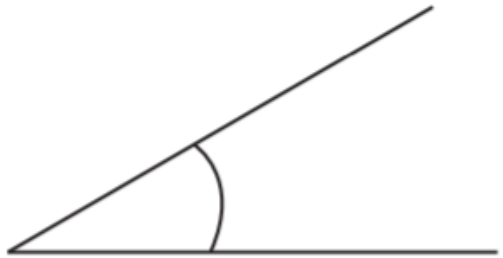
(1)

Tick (✔) the correct answer below.



( )

A

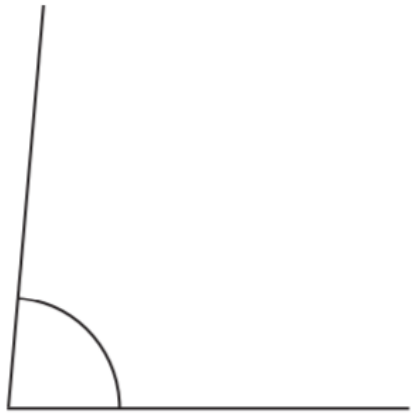


( )

B

( )

C



( )

D

FSM01/01, June 2016

Exam questions

Sajid wants to put a desk and a coffee table in his new office.

The desk is in the shape of a rectangle 100 cm by 160 cm.
Sajid wants to put the desk

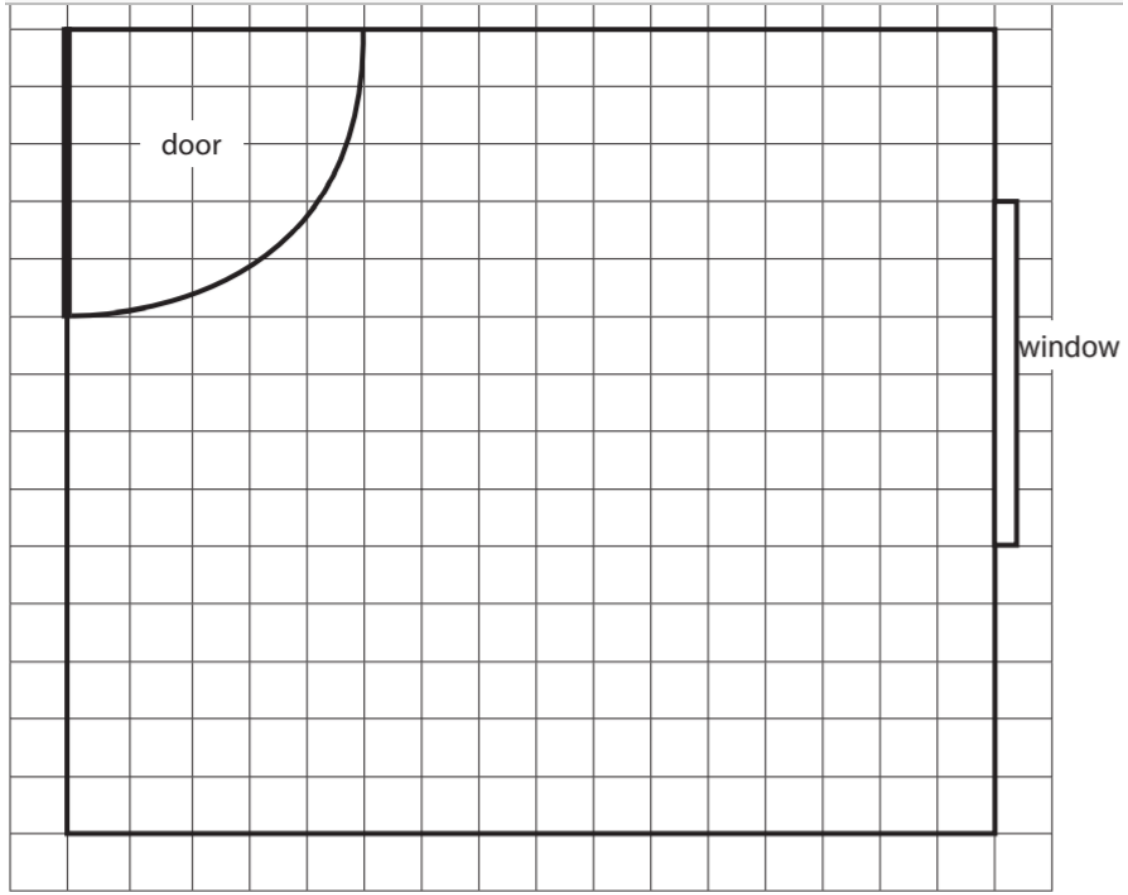
- against a wall
- at least 60 cm away from the window.

The coffee table is in the shape of a square with side length 80 cm.
He wants 40 cm of clear space around the coffee table.

Sajid draws this plan of the office on a grid.

Key: 1 square on the grid is 20 cm by 20 cm on the floor space

wall



(b) Draw the space for the desk and the space for the coffee table on the grid.
Label the desk D and label the coffee table T.

FSM01/01, June 2016

Exam questions

Liz wants to work out where to put a bed and a wardrobe in her daughter's bedroom.

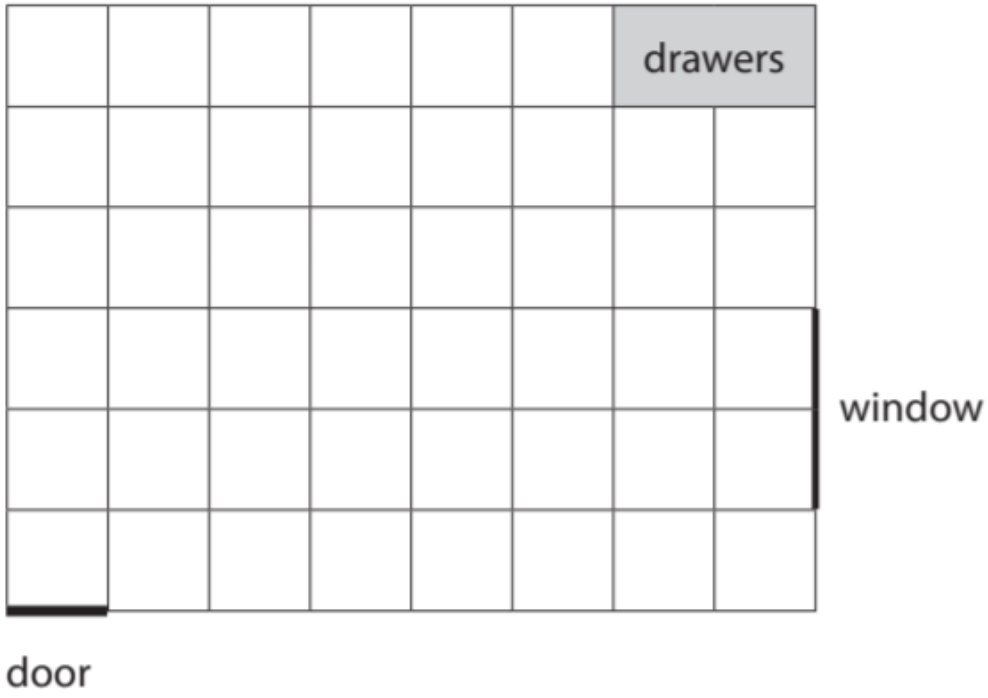
The bed needs a rectangular space 2 m by 1 m.
It must be in a corner of the room.

The wardrobe needs a rectangular space 2 m by $\frac{1}{2}$ m.

The longest side must be against a wall.

Liz draws a plan of the bedroom on a grid.

Key: 1 square on the grid is 50 cm by 50 cm in the room



Draw a space for the bed and a space for the wardrobe on the grid.

(3)

FSM01/01, May 2016

Exam questions

Eric wants to put some hair washing stations in a different room.
A washing station needs one sink and one chair.

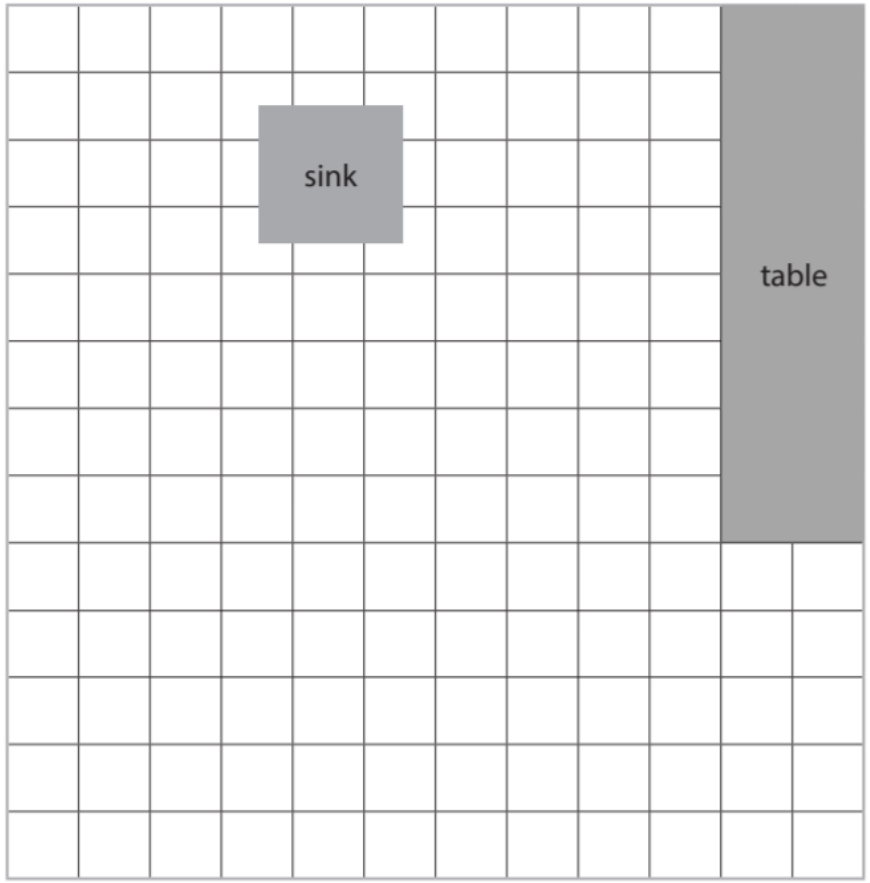
The chair needs

- a rectangular space 60 cm wide and 110 cm long
- one of its shorter sides to go along a side of the sink
- to have at least 50 cm of free space around its other sides.

Eric starts to draw a plan of one washing station on a grid.

Key

One square on the grid is 20 cm by 20 cm in the room.



(b) Draw a space for the chair on the grid.

FSM01/01,June 2016

Exam questions

Rashid is going to buy a table and a display unit.
He wants to work out where to put them in his dining room.

The table needs

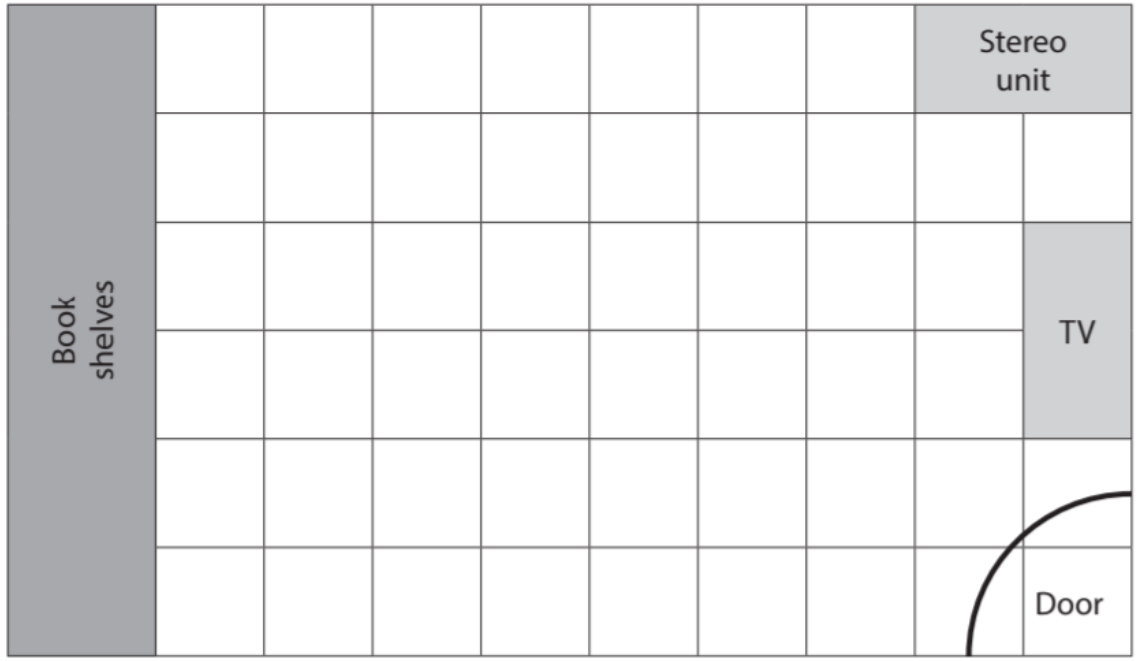
- a rectangular space 200 cm by 150 cm.

The display unit needs

- a rectangular space $1\frac{1}{2}$ m by $\frac{1}{2}$ m
- the longest side against a wall.

He draws a plan of the dining room on a grid.

Key: 1 square on the grid is 50 cm by 50 cm in the dining room



Draw the table and display unit on the plan for Rashid.

(4)

FSM01/01, Mar 2017

Exam questions

Marta needs to cover the whole floor in 3 of the beach huts with tiles.

The floor in each beach hut is rectangular 400 cm by 200 cm.
Each tile is square 50 cm by 50 cm.

Diagram **not** accurately drawn

Each tile costs £8.99

Marta has £850 to spend on the tiles.

(b) Is £850 enough to buy all the tiles Marta needs?

(6)

FSM01/01, Mar 2018