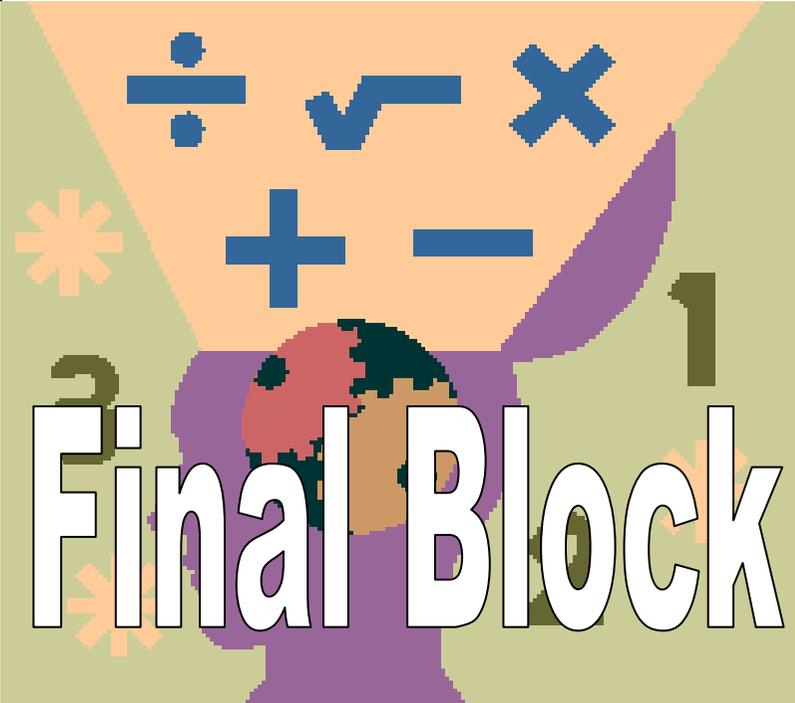


MATHEMATICS



Final Block

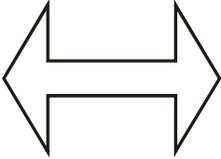
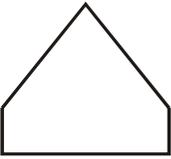
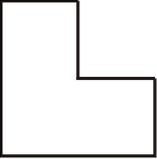
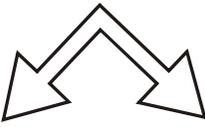
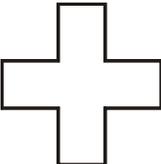
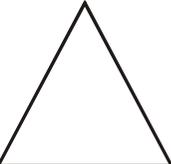
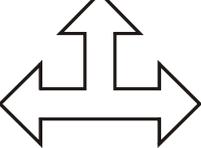
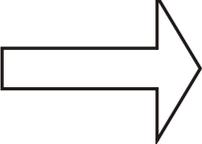
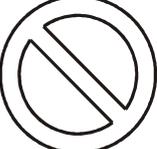
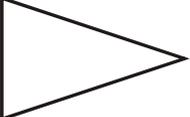
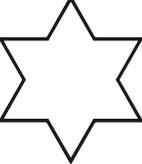
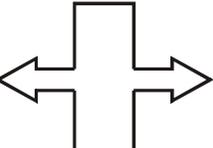
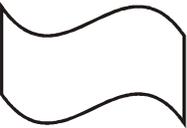


3rd Level

Symmetry

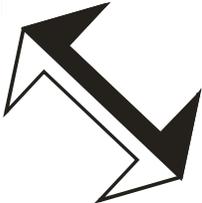
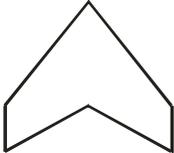
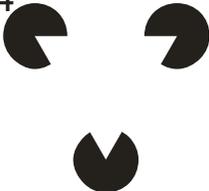
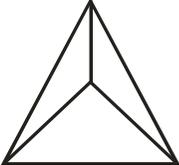
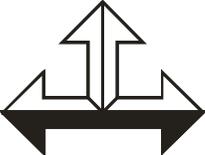
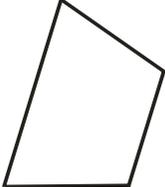
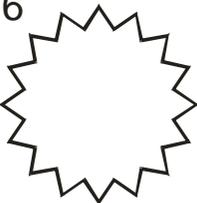
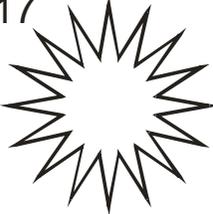
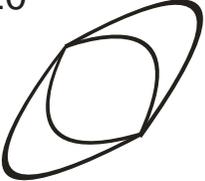
Exercise 1 (A)

Write down how many lines of symmetry each picture has.

1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 	14 	15 	16 
17 	18 	19 	20 

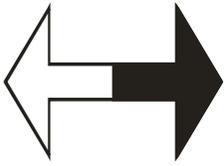
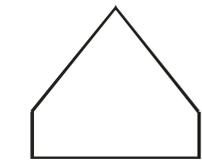
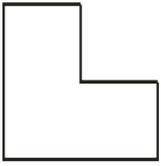
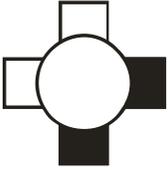
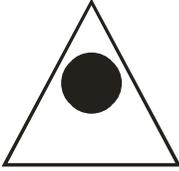
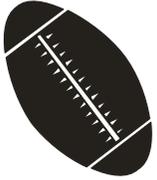
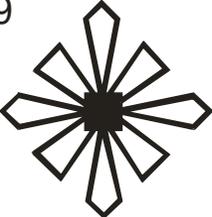
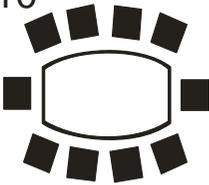
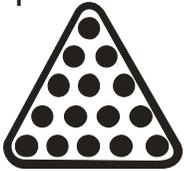
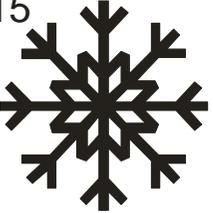
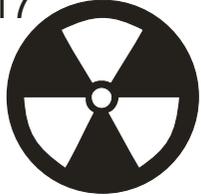
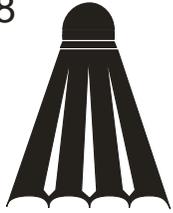
Exercise 1 (B)

Write down how many lines of symmetry each picture has.

1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 	14 	15 	16 
17 	18 	19 	20 

Exercise 1 (C)

Write down how many lines of symmetry each picture has.

1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 	14 	15 	16 
17 	18 	19 	20 

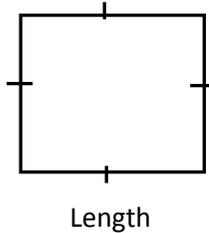
Drawing 2D shapes

Exercise 1 (A)

For this exercise you will need blank paper, a ruler and a protractor

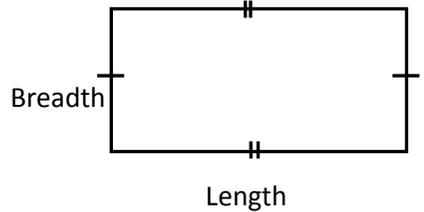
1 Draw a square with length:

- a 2cm
- b 4cm
- c 6cm
- d 3.5cm



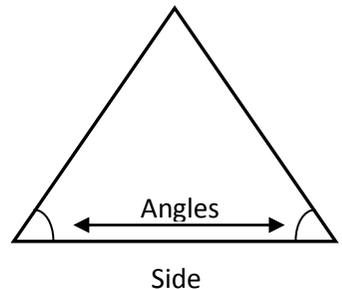
2 Draw a rectangle with:

- a Length 5cm Breadth 3cm
- b Length 12cm Breadth 4cm
- c Length 7cm Breadth 6cm
- d Length 2.5cm Breadth 8.3cm

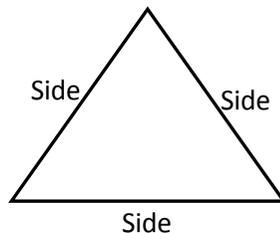


3 Draw exactly a triangle given one side and two angles

- a Side 7cm Angles 40° , 70°
- b Side 10cm Angles 60° , 50°
- c Side 11cm Angles 45° , 85°
- d Side 5.5cm Angles 25° , 90°



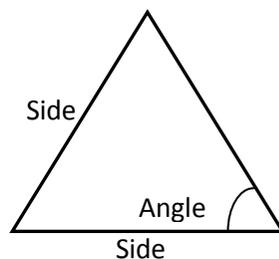
- 3** Draw exactly a triangle given all three sides (you will need your compasses)
- a** Sides 5cm, 5cm, 5cm
 - b** Sides 5cm, 6cm, 7cm
 - c** Sides 8cm, 6cm, 10cm
 - d** Sides 5cm, 12cm, 9cm
 - e** Sides 6.6cm, 5.3cm, 7.9cm
 - f** Sides 6.7cm, 7.6cm, 5.8cm
 - g** Sides 5.5cm, 6.5cm, 7.5cm
 - h** Sides 3.8cm, 4.9cm, 5.5cm



Exercise 1 (C)

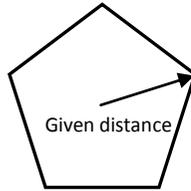
For this exercise you will need a ruler, protractor and a pair of compasses

- 1** Draw exactly a triangle given two sides and non included angle
- a** Sides 5.2cm, 4.8cm Angle 45°
 - b** Sides 6.1cm, 4.8cm Angle 32°
 - c** Sides 7.6cm, 8.1cm Angle 68°
 - d** Sides 4.9cm, 6.9cm Angle 98°
 - e** Sides 3.6cm, 4.1cm Angle 107°
 - f** Sides 2.9cm, 3.4cm Angle 25°
 - g** Sides 9.7cm, 11.4cm Angle 59°
 - h** Sides 2.1cm, 4.2cm Angle 120°



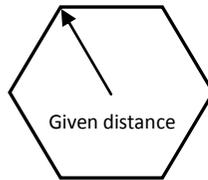
2 Draw exactly the following regular pentagons with the following distance from the centre to each vertex

- a** 5cm
- b** 6.2cm
- c** 5.3cm
- d** 4.9cm



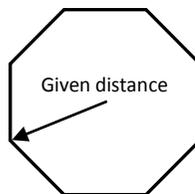
3 Draw exactly the following regular hexagon with the following distance from the centre to each vertex

- a** 4.1cm
- b** 7.2cm
- c** 8.3cm
- d** 1.9cm



4 Draw exactly the following regular octagon with the following distance from the centre to each vertex

- a** 8.5cm
- b** 6.2cm
- c** 4.9cm
- d** 5.1cm

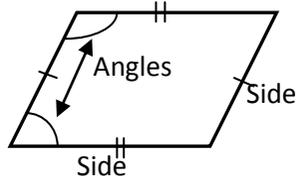


Exercise 2(B)

For this exercise you will need a ruler, protractor and a pair of compasses

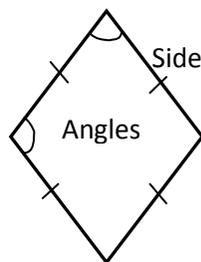
1 Draw exactly a **parallelogram** with each side and two angles

- | | | |
|---|--------------------|---------------------------------|
| a | Sides 7cm, 3cm | Angles 70° , 110° |
| b | Sides 10cm, 4cm | Angles 60° , 120° |
| c | Sides 11cm, 6.5cm | Angles 30° , 150° |
| d | Sides 5.5cm, 7.2cm | Angles 75° , 105° |
| e | Sides 6.3cm, 2.9cm | Angles 42° , 138° |



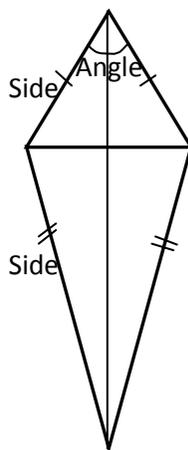
2 Draw exactly a **rhombus** given the sides and two angles

- | | | |
|---|------------|--------------------------------|
| a | Side 5cm | Angle 80° , 100° |
| b | Side 6cm | Angle 122° , 58° |
| c | Side 7.3cm | Angle 50° , 130° |
| d | Side 5.1cm | Angle 40° , 140° |
| e | Side 2.5cm | Angle 122° , 58° |



3 Draw exactly a **kite** given two sides and two angles (you will need your compasses)

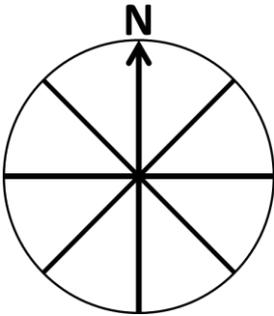
- | | | |
|---|--------------------|-------------------|
| a | Sides 3cm, 5cm | Angle 40° |
| b | Sides 2cm, 6cm | Angle 50° |
| c | Sides 4.5cm, 7.3cm | Angle 70° |
| d | Sides 5.1cm, 7.7cm | Angle 86° |
| e | Sides 7.7cm, 2.5cm | Angle 122° |



Bearings, Maps and Plans

Exercise 1 (A)

- 1 The diagram below shows a compass.



- a Copy the compass and fill in the other three main directions.

S

W

E

- 2 How many degrees are there from :-

- | | |
|----------------------------------|----------------------------------|
| a North to South (clockwise) | b North to East (clockwise) |
| c South to West (clockwise) | d North to West (clockwise) |
| e North to East (anti-clockwise) | f North to West (anti-clockwise) |
| g West to East (clockwise) | h East to North (anti-clockwise) |

- 3 State the size of the angle between :-

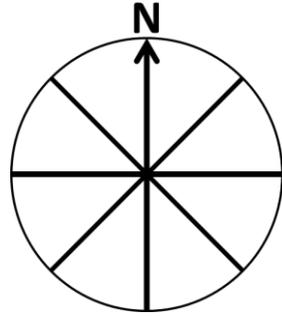
- | | |
|-----------------------------------|------------------------------|
| a North and West (anti-clockwise) | b South and East (clockwise) |
| c West and North (clockwise) | d East and North (clockwise) |

- 4
- Sammi is facing North. She turns 90° clockwise. Which direction is she now facing?
 - A boat is sailing South. The captain turns the boat by 90° in an anti-clockwise direction. Which direction is the boat now sailing in?
 - Stuart is running in a relay race. He is heading west and then turns 180° to run back to the start. Which direction is he now running in?

Exercise 1 (B)

- 1 Copy the compass and fill in the other seven directions shown.

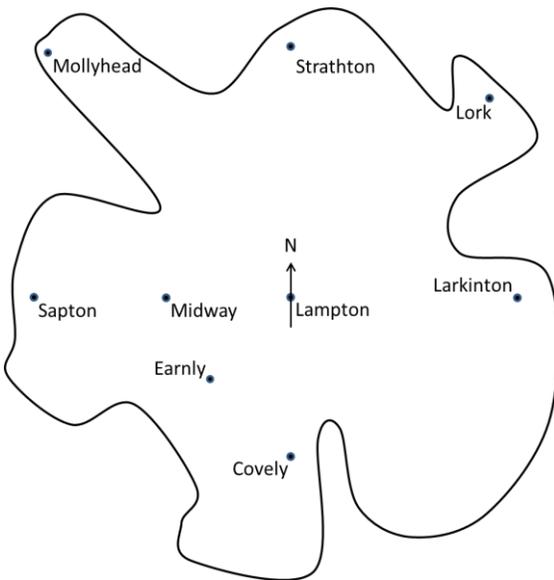
S NW E
SE W NE



- 2 State the size of the angle between :-

- | | |
|------------------------------|------------------------------|
| a N and NE (clockwise) | b N and SE (clockwise) |
| c S and NW (clockwise) | d W and NE (clockwise) |
| e N and NE (anti-clockwise) | f E and SW (anti-clockwise) |
| g NW and NE (anti-clockwise) | h SE and NW (anti-clockwise) |

- 3 The map shown below is the island of Carrington. The village of Lampton lies at the centre of the island



- a If I am standing in Lampton, which direction would the following places be?
- | | |
|---------------|-------------|
| (i) Strathton | (ii) Midway |
| (iii) Earnly | (iv) Lork |
| (v) Mollyhead | |
- b Where would I be looking towards if I faced in the following direction?
- | | |
|------------------|------------|
| (i) East | (ii) South |
| (iii) North East | (iv) West |
| (v) South West | |

Exercise 2 (A)

1 Write the following directions as 3-figure bearings :-

a North

b West

c East

d South

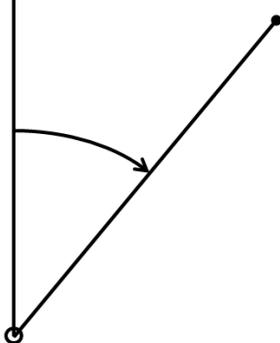
2 Measure the bearing of each town from Streetham

a

North



Seraville



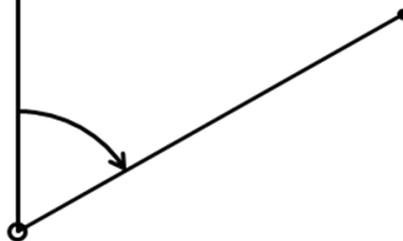
Streetham

b

North



Shawbank



Streetham

c

North



Garnock



Streetham

d North

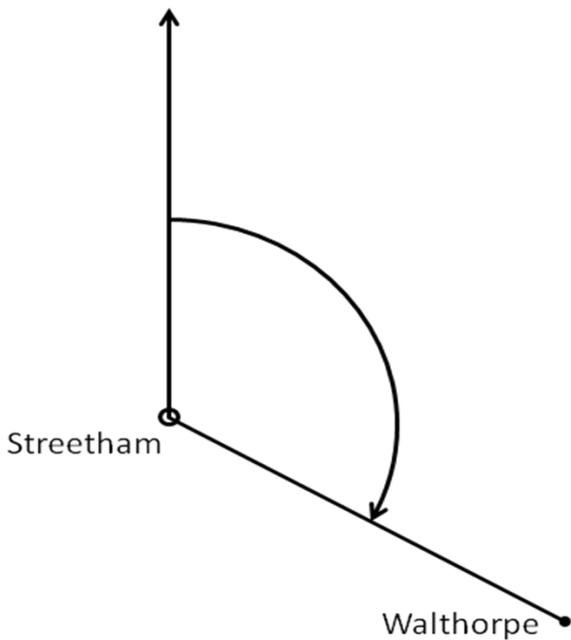


Mauchline

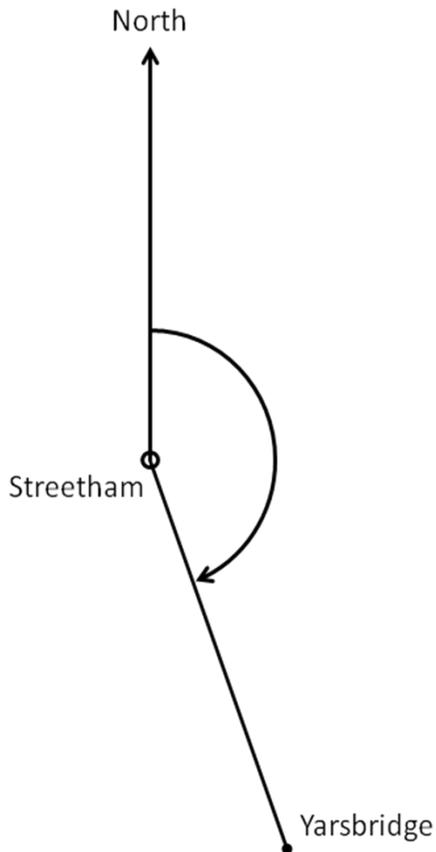


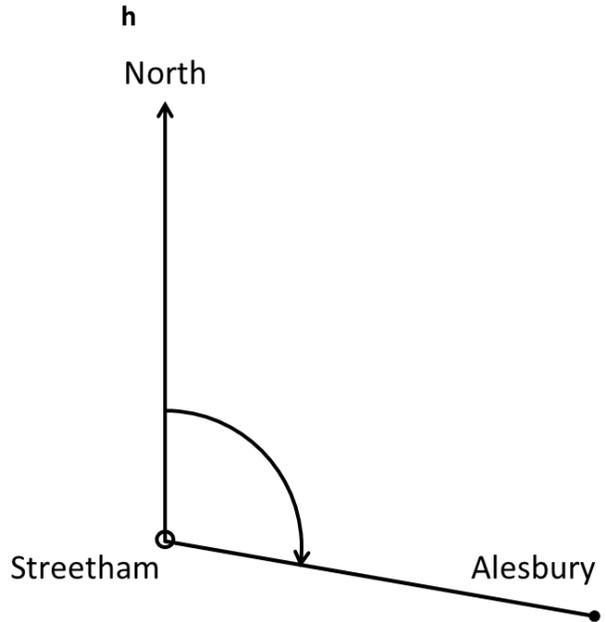
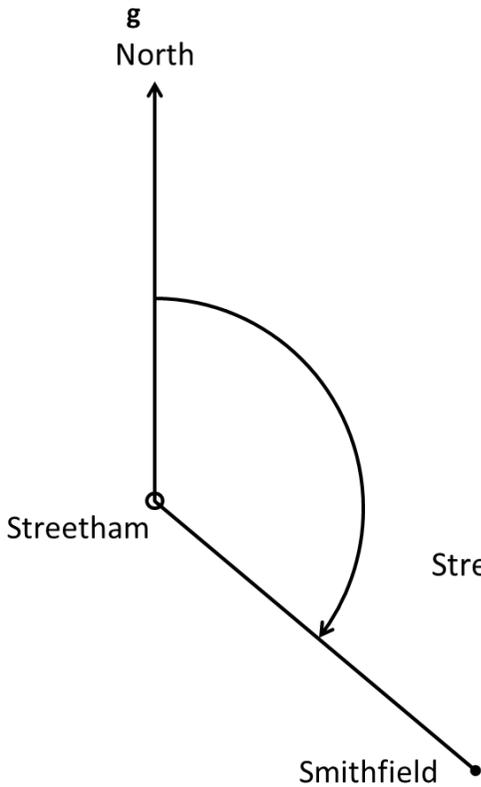
Streetham

e North



f





3 State which direction on a compass is given for the following 3-figure bearings :-

a 090°

b 000°

c 180°

d 270°

4 Chris lives in Stormington. He measures the bearings of some places from his house. Draw bearing diagrams for the following places :-

a Post Office (060°)

b Shop (110°)

c Gym (050°)

d Petrol Station (030°)

e Uncle Mike (160°)

f Church (090°)

g Pet Shop (170°)

h Local Dump (180°)

i School (080°)

Exercise 2 (B)

1 Write the following compass directions as 3-figure bearings :-

a NE

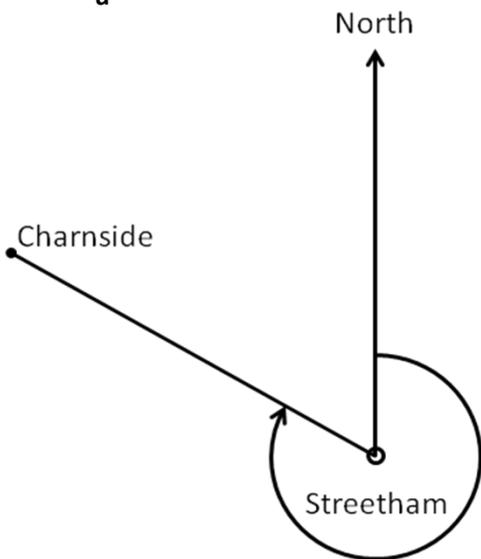
b SW

c NW

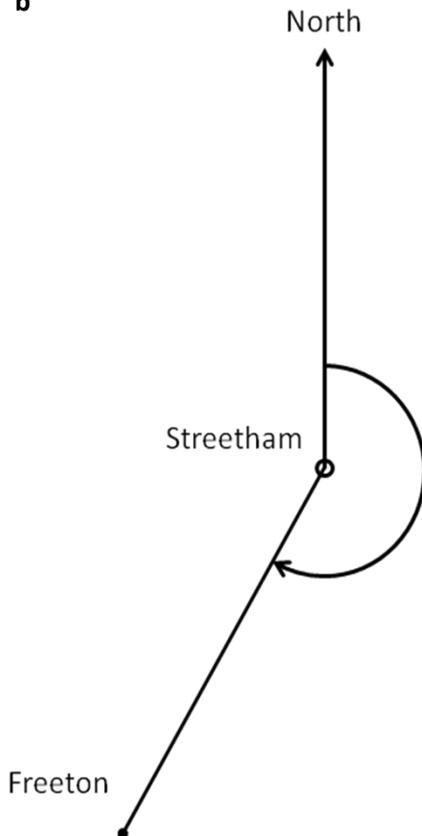
d SE

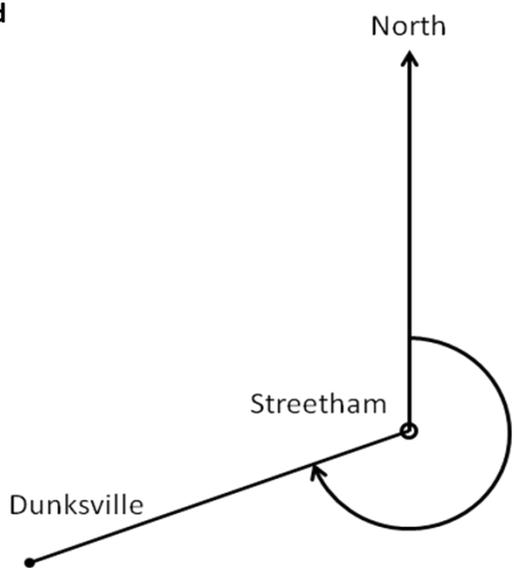
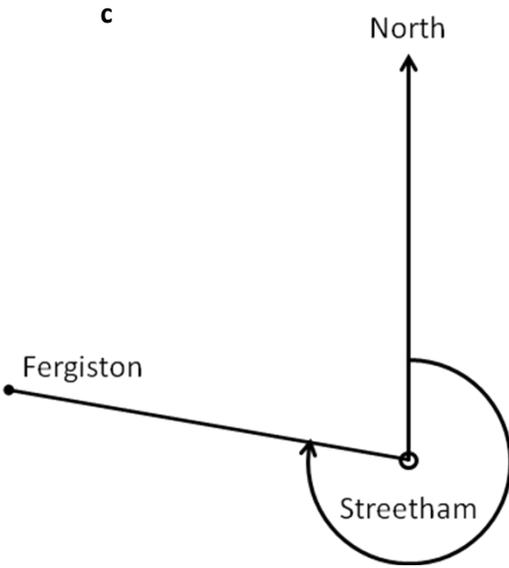
2 Measure the bearing of each town from Streetham

a

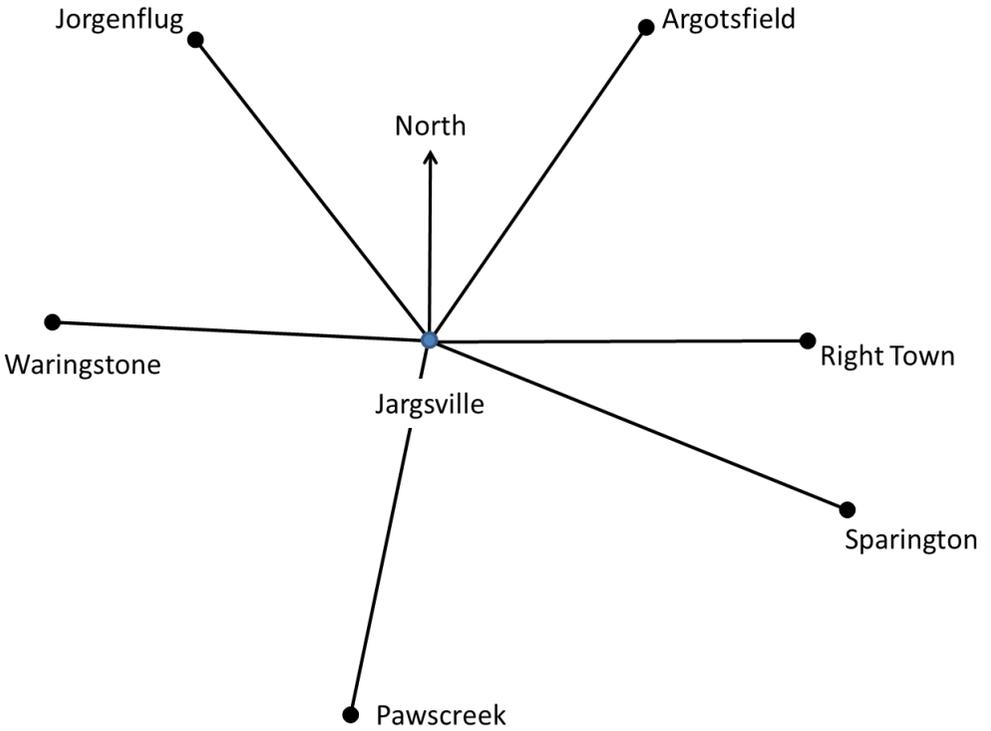


b





3 State the 3-figure bearing of each of the towns from Jargsville.



4 Draw a diagram for the each of the following bearings :-

a 085°

b 045°

c 185°

d 190°

e 218°

f 337°

g 114°

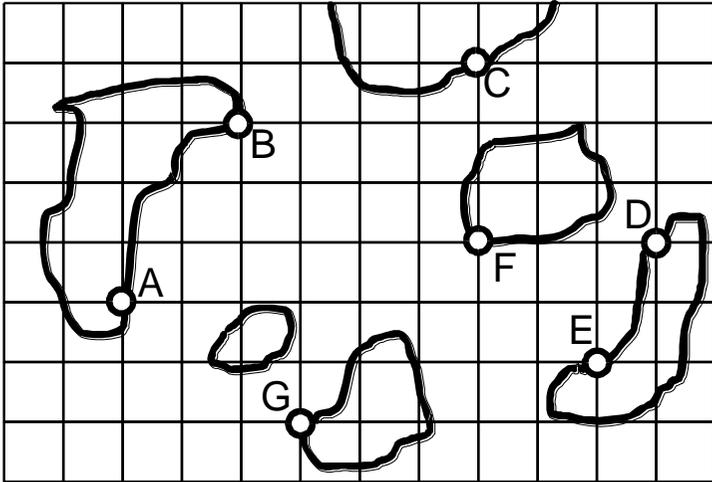
h 291°

Exercise 2 (C)

- 1 Steve leaves his camp and walks on a bearing of 157° . After a while he turns by 43° in a clockwise direction. What is his new bearing?
- 2 A pilot is flying on a bearing of 167° and makes a turn of 43° in an anti-clockwise direction. What is her new bearing?
- 3 From a bearing of 337° , a ship makes a clockwise course change of 60° . What is the new heading of the ship?
- 4 Michael is facing towards a lighthouse. He knows the bearing from his position to the lighthouse is 127° . How far, and in which direction, must he turn to face due west?
- 5 Amy is running in a relay race. At the start she is running north west. She reaches the turning point and turns 180° to return to the start.
 - a What is her new direction?
 - b What is her new bearing?
- 6 A ship leaves port and sails on a bearing of 060° . It develops engine trouble and must return to port for repairs. State the bearing the navigator will use to return to the port?
- 7 An aeroplane flies from Newquay to Birmingham on a bearing of 044° . On what bearing should the pilot fly, to return to Newquay from Birmingham?
- 8 A ship sails NW from a port to take supplies to an oil rig. On what bearing must it sail to return from the oil rig to the port?

Exercise 3 (A)

- 1 A ship leaves port A and sails to the six other ports on the map, calling at them in alphabetical order, before returning to A.



The route must only follow the grid lines on the map and must be entirely by sea. Each square is 1 km long.

Copy and complete the table with instructions for the route which must be taken. The route from A to B has been done for you.

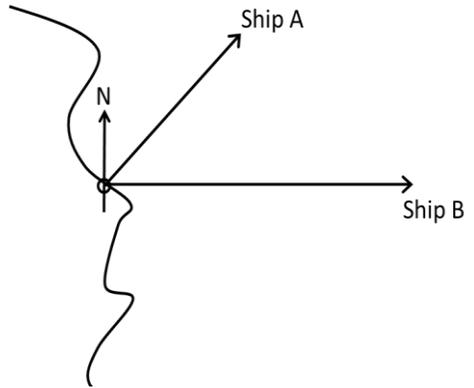
From	To	Direction and Distance		Direction and distance
A	B	East 2 km	then	North 3 km
B	C		then	
C	D		then	
D	E		then	
E	F		then	
F	G		then	
G	A		then	

Exercise 3 (B)

- 1** John walks due north for 4km. He then walks on a bearing of 090° for 3km.
 - a** Make an accurate scale drawing of his journey. (Use a scale of $1\text{cm}=1\text{km}$)
 - b** Measure the distance from his start point to his new location.
 - c** Calculate his actual distance from the start point.
- 2** A ship sails on a bearing of 180° for 120km. It then changes course and sails on a bearing of 090° for 600km.
 - a** Make an accurate scale drawing of the ships journey. (Use a scale of $1\text{cm}=20\text{km}$)
- 3** A plane leaves an airport and heads on a bearing of 270° and flies for 6km. The pilot then turns onto a bearing of 000° and flies for 4km.
 - a** Make an accurate scale drawing of the pilots flight path.
 - b** Calculate the total distance the pilot has flown.
 - c** How far would the pilot now need to fly on a bearing of 090° to be due north of the airport?
- 4** A flight from Glasgow to London starts on a bearing of 270° and flies for 5km. The pilot then makes a turn onto a bearing of 000° and flies for a further 12km.
 - a** Make an accurate scale drawing of the flight path.
 - b** Measure the bearing from the airport to the plane's new position.
 - c** Measure the distance the plane is from the airport on your scale drawing.
 - d** Use your drawing to calculate the actual distance the plane is from the airport.

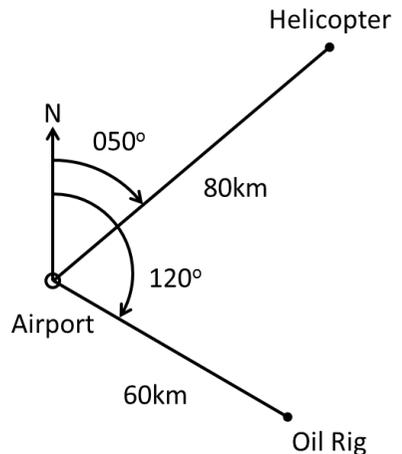
- 5 Two ships leave port at the same time. Ship A sails North East for 5km and Ship B sails East for 8km.

- Make an accurate scale drawing of the journeys. (Use a scale of 1cm=1km)
- Measure the distance between the two ships.
- Calculate the actual distance between the two ships.



- 6 The diagram shows the position of a helicopter after it leaves the airport.

- Make an accurate scale drawing of the plane's position. (Use a scale of 1cm=10km)
- Measure the distance from the helicopter to the oil rig.
- Calculate the actual distance of the helicopter from the oil rig.
- What bearing would the helicopter pilot need to fly to reach the oil rig?



- 7 The Glen Nevis Mountain Rescue team set out to rescue an injured climber. They leave camp and head on a bearing of 050° for 3km. They collect supplies and then head on a bearing of 120° for a distance of 4km and find the climber.

- How far was the climber from the camp?
- What is the bearing from the camp to the climber?

Exercise 3 (C)

- 1 Two radar stations measure the bearing of a light aircraft. Radar A is due south of Radar B and they are 90km apart. Radar A measures a bearing of 145° and Radar B measures a bearing of 050° .
 - a Make an accurate scale drawing showing the radar stations and the aircraft. Use a suitable scale.
 - b How far is the aircraft from Radar A?
 - c How far is the aircraft from Radar B?
 - d What bearing would the aircraft need to fly to reach Radar A?
- 2 Stuart is hill walking. He checks his map and measures the bearing to two points on his map. He measures a bearing of 030° to the village of Spoketon and a bearing of 340° to Craggy Hill. He knows that Craggy hill is due east of the village and that it is 8km from the village.
 - a Make an accurate scale drawing to show Stuart's position to the hill and village. Use a suitable scale.
 - b How far is Stuart from the village.
 - c If Stuart has parked his car half way between the hill and village, which bearing will he need to walk on to get to his car?
 - d How far is his car from his current position?
- 3 Two lookouts are positioned on top of two hills. Misha is 7km due west of Robbie's position. They both spot a distress signal from a ship. Misha measures a bearing of 053° and Robbie reports a bearing of 312° .
 - a Make an accurate scale drawing of the situation.
 - b How far is the ship from Misha's position?
 - c Both lookout stations have helicopters. Who should send help? (Give a reason for your answer)
- 4 Scott is going hill walking. He plans his journey on a map with a scale of 1:100000. His route on the map totals 10cm. How far will he actually walk on his trip?
- 5 The distance between two towns on a map is 35cm. If the map has a scale of 1:1000000, how far are the two towns apart?

- 6** Stuart is standing in the summit of a mountain. He can see the summit of another mountain in the distance. On his map he measures that it is 40cm away from his current position. If his map has a scale of 1:200000, how far is the other summit from his position?
- 7** Susan is making a map of her local area. She measures the actual distance between her house and her local shop. If the distance is 6km, what distance will this be on her map if she uses a scale of 1:300000?
- 8** The distance from a castle to the centre of the village is 400m. If the local map uses a scale of 1:2000, how far are the two locations on the map?
- 9** A cruise ship leaves port and sails on a bearing of 075° for a distance of 80km. It then changes course to a bearing of 120° . It stays on this course for a further 90km.
- a** Make an accurate scale drawing of the course of the ship.
 - b** How far is the ship from the port?
 - c** State the bearing from the port to the ship's final position.
- 10** A rescue helicopter is scrambled from an RAF station to rescue an injured climber. It leaves the station and flies for 40km on a bearing of 210° to pick up a doctor. It then flies to the climber on a bearing of 320° for 60km. State the bearing and distance the helicopter would have flown if it had went directly to the climber's position from the RAF station.