

CHAPTER 12

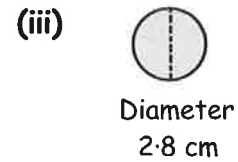
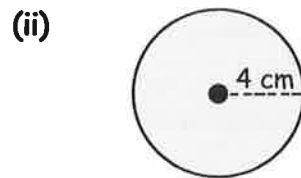
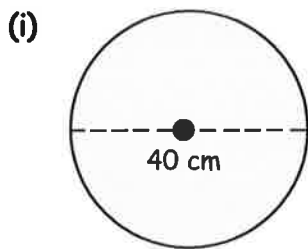


Review 11

Circle Revision

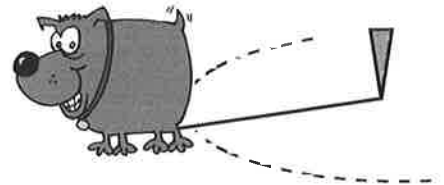


- Write down the formula for finding the :-
 - circumference of a circle
 - area of a circle.
- Use the correct formula to calculate the **circumferences** of these circles :-
(answers to 3 significant figures)



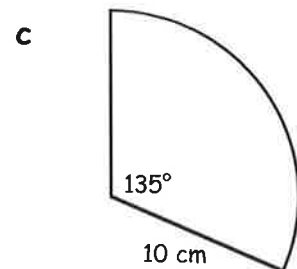
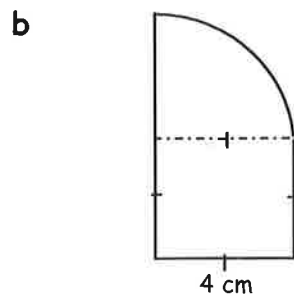
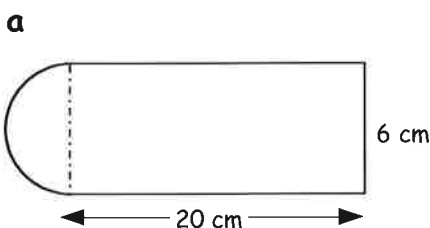
- Now use the correct formula to calculate the **areas** of the circles.

- A dog is tethered by a pole and can only move in a circular path .
The radius of its circular path is 150 centimetres.
Calculate the maximum circumference of the dog's walk.

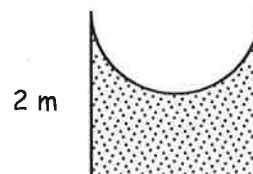


- The circumference of this pizza is 141.3 cm.
Use an appropriate formula to work out its **radius**.

- Calculate the **perimeter** and the **area** of each of these shapes :-



- Calculate the shaded area which consists of a 2 metre square with a semi-circle removed.



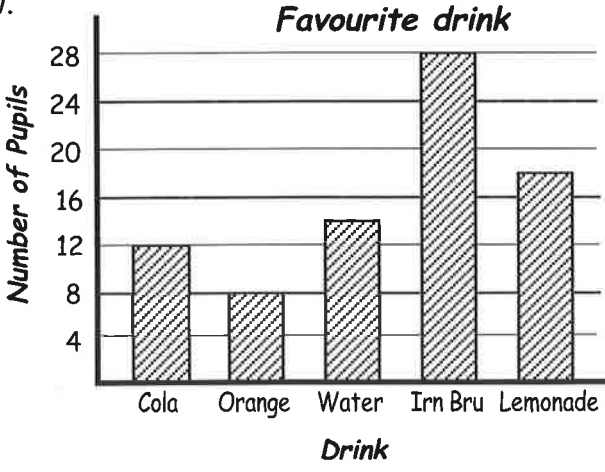
Exercise 1

Bar Graphs & Line Graphs



1. A group of children were asked to name their favourite drink. The results are shown in the bar-graph below.

- a How many children chose :-
 - (i) Cola (ii) Orange
 - (iii) Water (iv) Irn Bru
 - (v) Lemonade ?
- b List the drinks in order of most to least popular.
- c How many children were asked in the survey ?



2. A primary 5 class were asked about the towns they had visited.

London	Inverness	Carlisle	Newcastle	Leeds	Liverpool
6	8	3	7	1	5



Draw and label a neat bar graph to show this information.

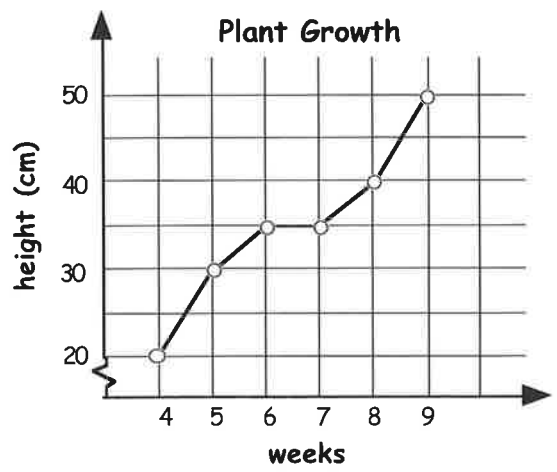
3. Pupils in the Primary 7 classes were asked to name the most commonly used vowel. The table shows their list of answers.

- a Make a frequency table and use tally marks to complete it.
- b Draw and label a neat bar graph from your frequency table.

A	E	A	E	I	O	U	A	E	E	E	E	E	E
U	I	A	E	A	E	I	O	U	A	E	E	E	E
E	E	U	I	A	E	A	E	I	O	U	A	E	E
E	E	E	E	E	E	U	I	A	A	O	E	O	E

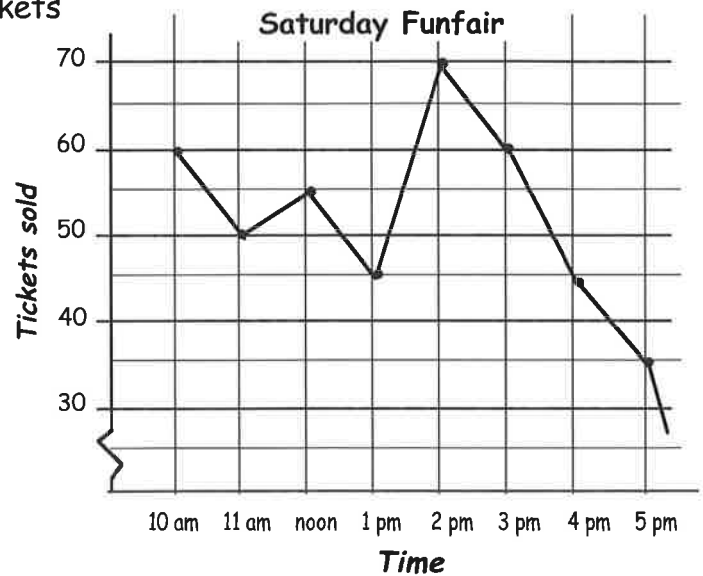
4. The line graph shows the height of a plant over a period of time.

- a How tall was the plant after :-
 - (i) 4 weeks (ii) 5 weeks
 - (iii) 9 weeks (iv) 7 weeks ?
- b On which week was the plant :-
 - (i) 35 cm (ii) 40 cm tall ?
- c One week the plant was not given any water. Which week do you think it was ?
- d Estimate the height of the plant at $8\frac{1}{2}$ weeks.



5. The line graph shows the number of tickets sold each hour at a Saturday Funfair.

- a How many tickets were sold :-
 (i) at 10 am (ii) at 11 am
 (iii) at 12 noon (iv) at 5 pm ?
- b What was the main peak time (most tickets sold) ?
- c Between which two times was there the biggest increase in ticket sales ?
- d Why do you think the ticket sales dropped after two o'clock ?



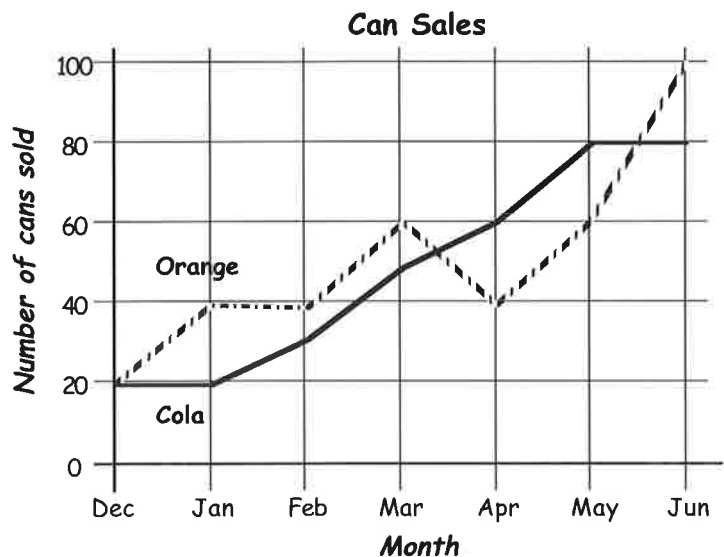
6. Another plant's height was recorded over a period of time.

Use the information from the table shown to draw a line graph.

Week 4 - 25 cm	Week 5 - 30 cm
Week 6 - 35 cm	Week 7 - 40 cm
Week 8 - 50 cm	Week 9 - 65 cm

7. The comparative line graph shows the sales of Orange and Cola from the tuck shop.

- a Which drink sold better in :-
 (i) January (ii) March
 (iii) April (iv) June ?
- b How many cans of Cola were sold in :-
 (i) January (ii) June ?
- c How many cans of Orange were sold in total ?



8. This table shows 6 months of car sales from two different car dealers, Arnold Clunk and Reg Barney.

Construct a **comparative line graph** to show this information.

	Jul	Aug	Sep	Oct	Nov	Dec
Clunk's	100	250	300	250	400	200
Barney's	300	200	350	450	100	150

Exercise 2

Spreadsheets & Databases



1. A joiner is cutting a series of rectangular panels of work-tops for six customers. He keeps a spreadsheet of their sizes in order to cost each piece.
 - a Open a new spreadsheet or draw up a table with the headings :-
cell **A1** - Joiner cell **B1** - length (cm) cell **C1** - breadth (cm)
 - b Fill in the following customer details, starting in cell **A3** :-

Greg	- 50 cm by 40 cm	Wyatt	- 80 cm by 100 cm
Josh	- 180 cm by 110 cm	Tom	- 75 cm by 165 cm
Riva	- 225 cm by 100 cm	Scott	- 67 cm by 144 cm.
 - c Save and printout of your spreadsheet.

Exercise 3

Calculations in Spreadsheets



Use your spreadsheet saved from Ex 2 above.

1.
 - a Add a fourth column, (Area).
 - b Type in formulae to the appropriate cells to calculate the **area** each joiner requires.
 - c Add a fifth column, (Price).

Each panel of wood costs £0.02 per square cm.

- d Type in formulae to the appropriate cells to calculate the cost to each joiner.

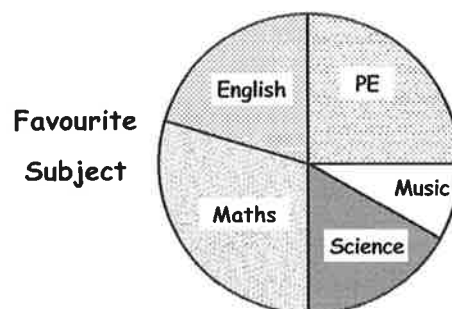
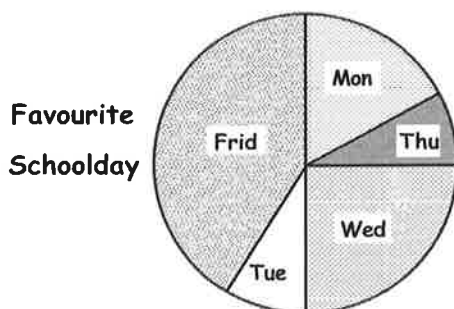


Exercise 4

Interpreting & Drawing Pie Charts



1. A class surveyed the most popular schoolday and favourite subject. The results are displayed using the pie charts below.



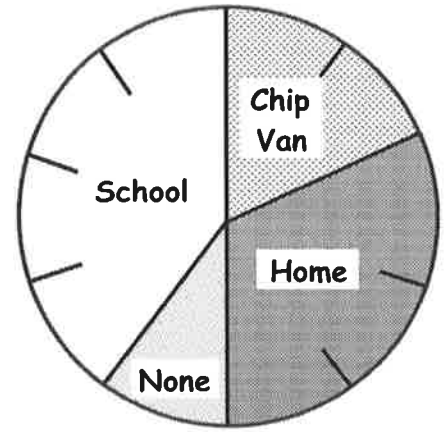
- a Write the classes' favourite :- (i) schoolday (ii) subject.
- b List the favourite days in order, from most popular.
- c List the favourite subjects in order, from least popular.

2. The pie chart, which has been split into 10 sections, shows the results of a class survey into favourite lunchtime places to eat.

a What fraction of the class chose :-

- (i) Chip Van (ii) Home
- (iii) None (iv) School.

b List the places in order, from most popular to least popular.



3. Look at the pie chart in question 2.

50 pupils were asked their favourite lunchtime place.

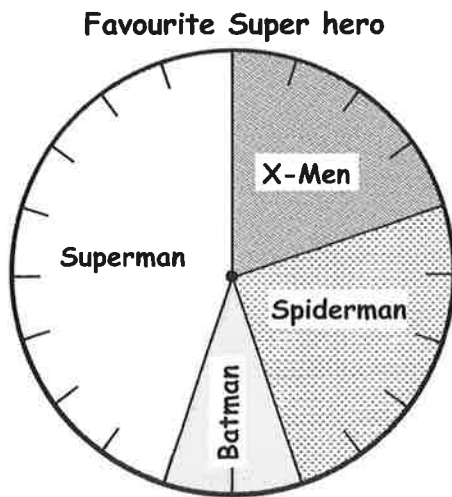
a How many pupils does each individual section stand for ?

b How many pupils chose :-

- (i) School (ii) Chip Van (iii) Home (iv) None ?



4. This pie chart has been divided into 20 equal parts.



a What fraction does each part stand for ?

b What fraction represents :-

- (i) Superman (ii) X-Men
- (iii) Spiderman (iv) Batman ?

100 people were questioned in the survey.

c How many people does each small section represent ?

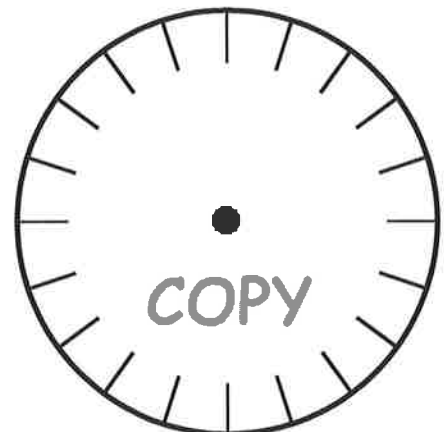
d How many people chose :-

- (i) Superman (ii) X-Men
- (iii) Spiderman (iv) Batman ?

5. 100 people were asked to name their favourite colour.

<i>Black</i>	-	40	<i>Blue</i>	-	25
<i>Silver</i>	-	20	<i>Red</i>	-	5
<i>Orange</i>	-	10			

Copy (or trace) the blank pie chart, and complete it showing the above information.



Exercise 5

Drawing Pie Charts using a Protractor

1. a Copy and complete the table showing a S2 class' favourite carry-out.

Car Colour	Number	Fraction	Angle
Indian	7	$\frac{7}{30}$	$\frac{7}{30} \times 360 = \dots^\circ$
Chinese	6		$\times 360 = \dots^\circ$
French	5		$\times 360 = \dots^\circ$
British	12		$\times 360 = \dots^\circ$
TOTAL	30		360°

- b Construct an accurate pie chart showing this information.

2. Below are the results of a survey asking people's favourite fruit.

Banana	Orange	Plum	Apple	Plum	Apple	Orange
Banana	Apple	Plum	Orange	Apple	Orange	Apple
Plum	Apple	Orange	Apple	Pear	Banana	Orange
Pear	Apple	Apple	Plum	Orange	Pear	Apple
Apple	Banana	Pear	Plum	Orange	Apple	Apple
Apple	Orange	Apple	Orange	Banana	Apple	Banana



- a Copy and complete the table below :-

Fruit	Tally Mark	Number	Fraction	Angle
Apple				
Orange				
Banana				
Plum				
Pear				

- b Using a pair of compasses, a ruler and a protractor, construct an accurate pie chart for this information.

Exercise 6

Mean and Range



1. The **range** (= highest - lowest).

For each set of data, find the **RANGE** of numbers :-

a 7, 9, 8, 12, 6, 15, 8, 7, 10, 10, 12, 5, 9, 11

b 73, 57, 44, 11, 33, 8, 26, 1, 4, 2, 74, 16, 15, 7.

2. Find the **mean** of :-

a 8, 10, 12, 14

b 14, 50, 23, 41, 62, 50

c £2, £5, £8, £26, £20, £11.

d 9.1 cm, 10.3 cm, 7.6 cm, 4.1 cm, 3.9 cm.

3. Ten boxes of matches have their contents counted.

It is found that they contain the following number :-

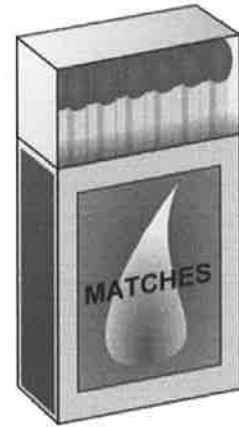
60, 62, 64, 62, 65, 61, 63, 60, 64, 64.

a Work out the range.

b Calculate the **mean** number of matches.

c The Match Company claim that each of their boxes should contain an average of 63 matches.

Is the company's claim correct? (*Explain*)



4. Tom sat two mental tests (each out of 10). His **mean** score for the tests was 6.

If Tom scored 9 in the first test, what must he have scored in the second?

Exercise 7

Median & Mode



1. Find the **mode** for each set of data :-

a 1, 1, 2, 3, 5, 8, 13, 21, 34, 55

b 3, 2, 1, 8, 4, 5, 9, 2, 7, 6, 0

c 1.7, 2.3, 1.6, 3, 2.3, 3.7, 2.9

d A, C, F, G, H, Y, T, E, D, D, G, H, G.

2. For each set of data, find the **MEDIAN** :-

(Make sure you put the numbers in order first)

a 5, 6, 6, 7, 8, 9, 9, 10, 11

b 16, 18, 18, 20, 24, 26, 28, 32

c 17, 9, 3, 9, 9, 5, 7, 13, 11, 15, 15, 9, 9, 7, 1, 1, 17, 15, 13, 13, 7.

3. Find the **mean, median, mode** and **range** of each set of data :-

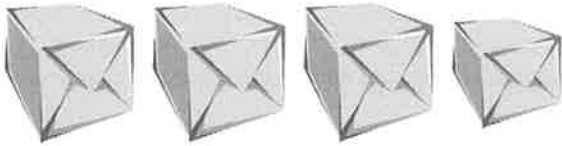
a 10, 12, 14, 15, 16, 19, 22, 23, 23

b 46, 31, 66, 73, 83, 43, 16, 66

c 4, 1, 14, 12, 6, 7, 11, 13, 9, 1

d All the prime numbers between 30 and 50.

4.



The mean weight of 4 boxes is 75 kg.

Three of the boxes each weigh 85 kg.

What is the weight of the fourth box ?

Exercise 8

Stem & Leaf Diagrams



1. The stem and leaf diagram shows the ages of people in a post office queue.

a Write a key for the diagram.

b Write down all the ages.

c How old was the youngest person ?

d What was the modal age ?

e Find the median.



Peoples' Ages

2	2	2	6	9		
3	0	4	5	6		
4	0	1	1	1	2	4
5	2					
6	0	3				

2. For each set of data shown :-

(i) Construct an **ordered** stem and leaf diagram. (ii) Find the mode and median.

a Ages of mature students at a University.

23	42	27	37	25	60	29	35	26	45	35	26
50	39	27	26	42	47	26	59	42	23	29	29
20	51	43	44	28	46	42	27	52	30	30	42

b Distances (in metres) jumped from a standing position.

1.62	1.23	1.41	1.15	0.97	1.31	1.23	1.26	1.5
1.33	1.29	1.12	1.23	1.19	1.36	1.53	1.08	1.23
0.9	1.2	1.51	1.03	1.66	1.53	1.44	1.23	1.39

3. a Draw an **ordered** back to back stem and leaf diagram showing the details about how far (*in centimetres*) S1 and S2 pupils could jump from a standing position.

S1	148	156	172	181	160	157	164	132	184	146	157	139
S2	182	174	138	145	175	162	159	175	167	173	144	150

- b Find the modal and median heights of :- (i) S1 (ii) S2.
 c Write a few sentences comparing the mode and the median of both groups.

Exercise 9

Conducting a Survey

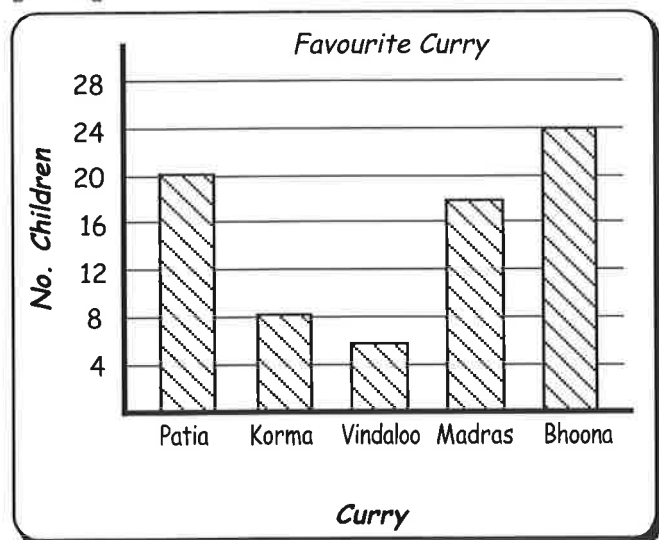


- A pupil wants to conduct a survey into extending school lunchtime by 30 minutes. State why the pupil, in his/her questionnaire, should **not** ask only :-
 - other pupils
 - local shops
 - local police.
- Construct a short questionnaire to investigate the following :-
 - How much do people spend on drinks every week ?
 - How many DVD's or videos do people buy each year ?
- Describe the meaning of "discrete" and "continuous". Give an example of each.

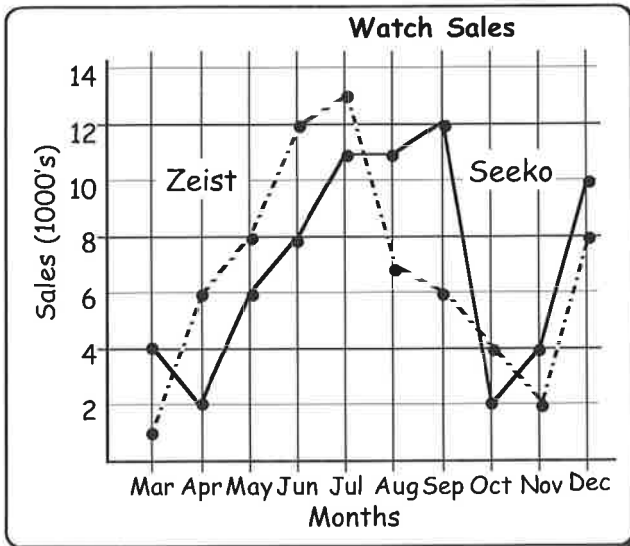
Revisit - Review - Revise 12



- A survey was carried out in a first year group asking their favourite type of curry.
 - How many chose Patia ?
 - How many chose Vindaloo ?
 - How many **more** chose Bhoona than Korma ?
 - How many **less** chose Vindaloo than Bhoona ?
 - How many pupils were asked **altogether** ?
 - Forty percent of pupils who picked Patia were **girls**.
How many **boys** picked Patia ?



2.



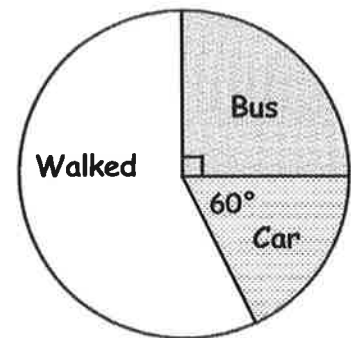
The line graph shows the number of watches sold by two companies over a period of 10 months.

- Seeko's sales are shown in **black**.
 - Zeist's sales are in **dotted black**.
- a In which months did sales peak for each company ?
 - b Who sold more watches in May - how many more ?
 - c Which company had the biggest fall in sales between two months - which two months was that ?

d Overall, who sold more watches over the period ?

3. In a pupil survey, 240 pupils were asked which method of travel they took to get to school. The results are shown in the pie chart.

Travelling to school



- a What **angle** at the centre is taken up by Walking ?
- b How many pupils walked ?
- c How many **more** took the bus than travelled by car ?

4. Ellen checked out different prices for a new V-box games console .

Prices were :-

£133	£148	£154	£180	£170	£160	£180	£148	£154	£167
£160	£176	£133	£154	£165	£170	£143	£182	£161	£154

- a Construct an **ordered stem-and-leaf** diagram, using a key :- $16 \mid 7 = \text{£}167$.
- b What is the **modal** price of the console ?
- c Determine the **median** price.

5. The table shows the hair colour of pupils in a class.

- a How many pupils are in the class ?
- b Copy and complete the table.
- c Construct a neat accurate **pie chart** to show the information.

Hair colour	Number	Fraction	Angle
Black	10	$\frac{10}{30}$	$\frac{10}{30} \times 360 = \dots^\circ$
Brown	12		$\times 360 = \dots^\circ$
Red	2		$\times 360 = \dots^\circ$
Blonde	6		$\times 360 = \dots^\circ$
TOTAL	?		360°



6. Find the range, mean, median and mode of each set of numbers :-

- a 85, 26, 55, 22, 85, 16, 36, 12, 15.
- b 7 m, 8 m, 7 m, 9 m, 8 m, 7 m, 7 m, 8 m, 11 m, 8 m, 11 m, 8 m, 11 m
- c 6°C, -3°C, 3°C, 9°C, -5°C, 7°C, 11°C, -17°C, 6°C, 3°C
- d 50 g, 40 g, 140 g, 70 g, 90 g, 100 g, 40 g, 60 g.

7.



Mean number of coffee beans per packet is 12

The contents of ten mini-packs of coffee beans are counted.

The packets have the following number of beans :-

11, 13, 9, 12, 10, 11, 10, 10, 13, 11.

- a Why is the manufacturer's claim wrong ?
- b An eleventh box is examined.
How many beans would need to be in that packet in order for the manufacturer's claim to **then** be considered correct ?

8. Shown are the number of litres of milk bought by two families over a 10 day period.

Smith	2	6	2	2	2	5	3	2	6	5
Jones	1	3	3	4	1	2	3	3	4	1

- a Write down the **modal** amount bought by each family.
- b Which family appears to be buying more milk, "on average" ?
- c Give a reason why it is unfair to compare their purchases by using the mode.
- d Which "average" would give a better answer in this question ?

9. Here are the prices shown by ten shops for a 3.5 litre container of milk.

£1.75, £1.80, £1.85, £1.76, £1.80, £1.81, £1.83, £1.85, £1.75, £1.80.

- a Find the range of prices.
- b Find the **mode**, the **median** and the **mean** price.

10. The **mean** age of 4 boys is 16 years old.
Three of the them are aged 13, 15 and 19.
How old is the 4th boy ?



Cumulative Ex 4



1. Find :- a 9^3 b 2^{11} c $\sqrt[5]{243}$.

2. a Find the **highest common factor** (h.c.f.) of 12, 60 and 72.
 b Write down **all the prime numbers** between twenty and forty.
 c Write as the **product of prime factors** :- (i) 54 (ii) 105.

3. Write down a **formula** of the form $y = \dots \times \dots$ indicating the connection between the values.

x	-2	0	2	4
y	-8	-6	-4	-2

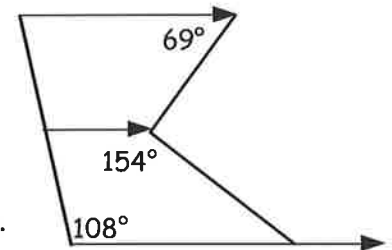
4. Solve for x :-

a $9x - 4 = 12x + 8$

b $2(4x - 3) - 5x = -3$.

c $3(4x - 3) < 15$.

5. Copy the sketch shown and fill in **ALL** missing angles.



6. Change to litres :-

a 600 000 ml

b 650 ml

c $10\frac{1}{4}$ million ml.

7. Change to ml :-

a 10 litres

b 3.25 litres

c 0.003 litres.

8. Make an accurate drawing of triangle EFG with EF 9 cm, EG 6 cm and $\angle FEG 40^\circ$.

9. Simplify fully (where possible) :-

a $\frac{5}{8} \times \frac{2}{3}$

b $4\frac{2}{3} \times 1\frac{1}{5}$

c $\frac{8}{15} \div \frac{8}{9}$

d $3\frac{3}{4} \div 2\frac{1}{2}$.

10. The area of a rectangle is $5\frac{3}{5}$ cm and has length $4\frac{2}{3}$ cm. Find its breadth.

11. Write the **3 figure bearing** for :-

a East

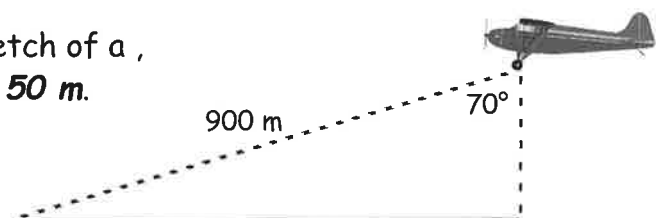
b North West.

12. A model ship has been made to a scale :- 1 cm to 12.5 m.

If the length of the model ship is 20 cm, what is the length of the **real** ship ?

13. a Make a **scale drawing** of this sketch of a , runway using a scale :- 1 cm = 50 m.

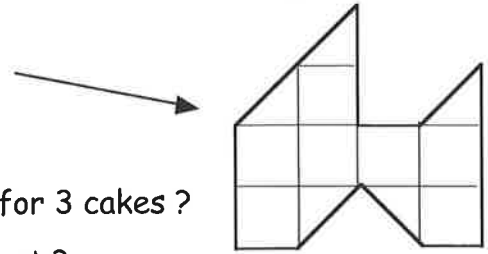
- b Determine the **real** length of the runway.



14. A boat leaves port on a 200° bearing. What would be the return bearing?

15. Draw a neat **2 times** enlargement of this shape.

Each box is a 1 centimetre square.



16. a One cake costs £3.40. How much would it cost for 3 cakes?

b Two pies cost £3. How much would three pies cost?

c How much would five containers cost, if six cost £21.60?

17. a Share £2000 in a ratio of 4 : 1. b Share 280 sweets in a 3 : 4 ratio.

18. a Write down how many lines of symmetry each of these shapes has :-

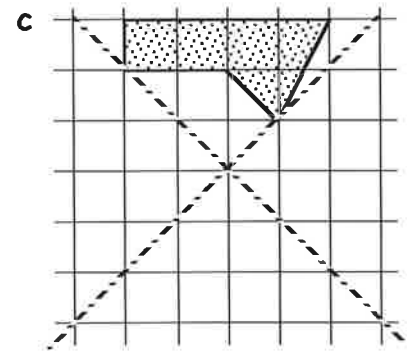
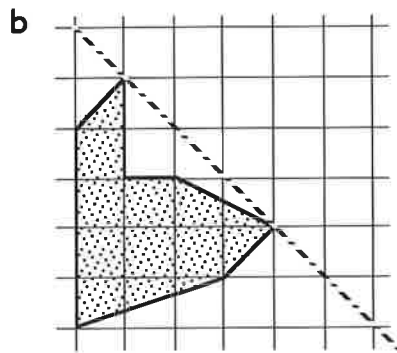
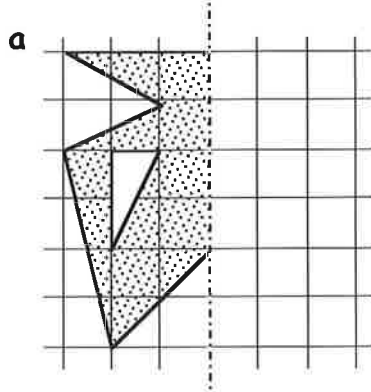
(i) square

(ii) rectangle

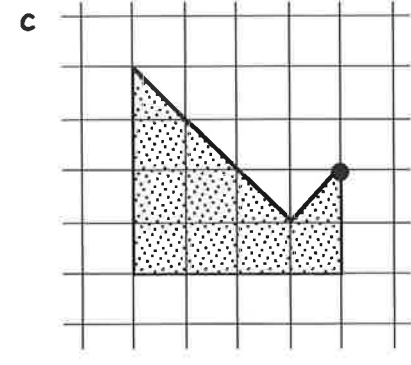
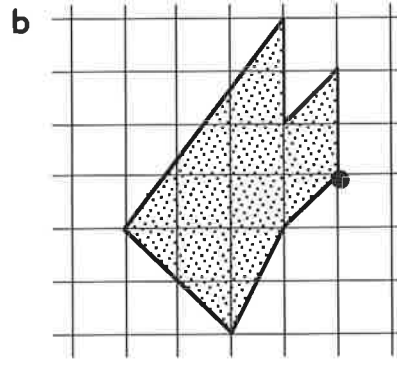
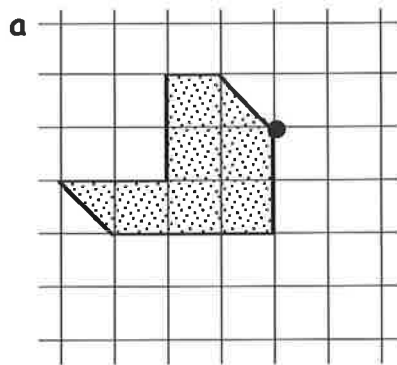
(iii) parallelogram.

b State, for each shape in Question 18a, the order of rotational symmetry.

19. Copy these shapes neatly on to squared paper and complete the diagrams so that the **dotted** lines are lines of symmetry :-



20. Copy these shapes and give each of them a half turn around the dot.



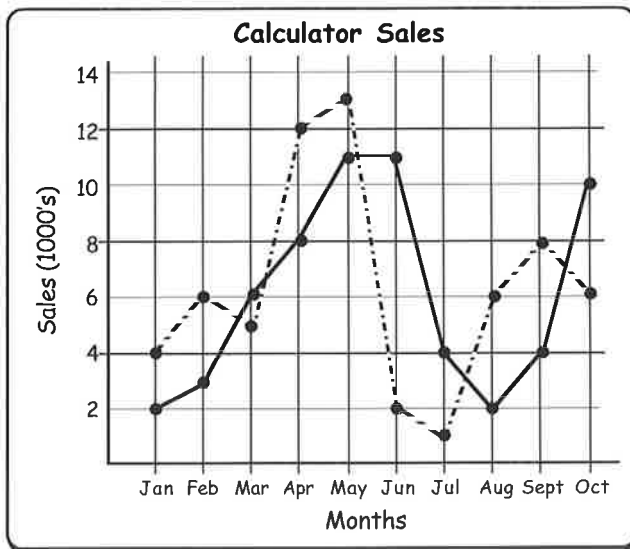
21. State two shapes that :- a would tile a plane b would NOT tile a plane.

22. Find the **range, mean, median and mode** of each of these set of numbers :-

a 92, 33, 62, 29, 92, 23, 43, 19, 22

b 4, -5, 1, 7, -7, 5, 9, -15, 4, 1.

23.



The line graph shows the number of calculators sold by two companies over a period of 10 months.

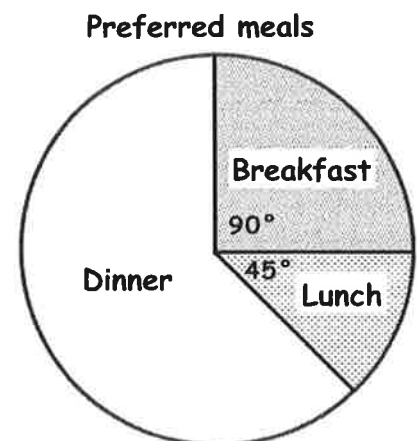
- ToTal's sales are shown in **black**.
 - CalcSUM's sales are in **dotted black**.
- a In which months did sales peak for each company ?
 - b Who sold more calculators in May - how many more ?
 - c Which company had the biggest fall in sales between two months - which two months was that ?

- d Overall, who sold more calculators over the period ?
- e Suggest a reason for an increase in sales by both companies in April.

24. In a pupil survey, 720 people who had retired were asked which meal of the day they preferred.

The results are shown in the pie chart.

- a What **angle** at the centre is taken up by Dinner ?
- b How many chose :- (i) breakfast
(ii) dinner ?
- c How many **less** chose lunch rather than dinner ?



25. Ellen checked out different prices for a new IAGO BluRay player .

Prices were :-

£77, £74, £68, £69, £83, £83, £80, £92, £73, £79
£69, £70, £83, £81, £90, £77, £75, £78, £60, £88.

- a Construct an **ordered stem-and-leaf** diagram, (Don't forget to include a **key**).
- b What is the **modal** price of the console ?
- c Determine the **median** price.

26.



The **mean** price of four rock concert tickets is £21.

Three of the tickets cost £17, £24 and £19.

What is the price of the other one ?