C66 D55 E44 F33 G22

OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS SYLLABUS A

J512/01

Paper 1 (Foundation Tier)

Solutions

OCE/15067

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
- Geometrical Instruments
- Tracing paper (optional)

Tuesday 12 January 2010
Morning

Duration: 2 hours

J 5 1 2 0 1 1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **100**.
- This document consists of **24** pages. Any blank pages are indicated.

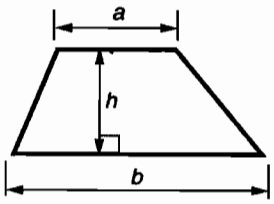
WARNING
No calculator can be used for this paper

DC (KN) 15067/5

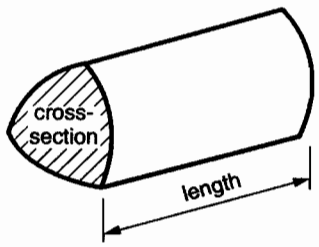
Turn over

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = (area of cross-section) × length



PLEASE DO NOT WRITE ON THIS PAGE

1 Work out.

(a) 288 + 57

288
57 +
345

.....

.....

(a) 345 [1]

(b) 206 – 91

1 1
206
91 –
115

.....

.....

(b) 115 [1]

(c) 14 × 6

14
6 ×
84

.....

.....

(c) 84 [1]

(d) 126 ÷ 7

18
7) 126

.....

.....

(d) 18 [1]

2 **(a)** Complete these sentences with the correct **metric** unit.
Choose from the list below.

millimetres	grams	tonnes	square metres
kilometres	litres	kilograms	metres

(i) An adult male elephant weighs about 7 tonnes. **[1]**

(ii) The length of an adult male elephant is about 6 metres. **[1]**

(iii) An elephant's trunk can hold about 8 litres of water. **[1]**

(b) A website about elephants has the following sentence.

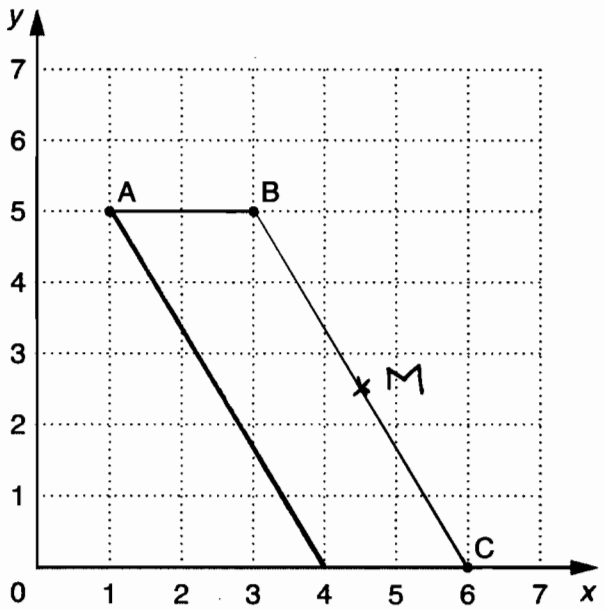
Elephants have poor eyesight and can only see a distance of 8 square metres.

Give a mathematical reason why this sentence **must** be wrong.

Distance measured in metres not square metres **[1]**

(Square metres measures an area)

3 Three points A, B and C are marked on this grid.
A line has been drawn from A to B.



(a) Write down the coordinates of point A.

(a) (1 , 5) **[1]**

Draw the line from B to C.

(b) Measure the length of the line BC.
Give your answer in millimetres.

(b) 55 mm **[2]**

(c) Mark the midpoint of the line BC. Label it M. **[1]**

(d) On the grid draw a line, through A, **parallel** to BC. **[1]**

(e) Points A, B and C are 3 corners of a parallelogram, ABCD.

Write down the coordinates of the fourth corner, D.

(e) (4 , 0) **[1]**

4 Two classes of Year 9 students had a History test.

(a) The marks for students in class 9R are given below.

12	20	32	8	25	15	30	17	21	31
6	22	18	26	17	12	9	32	22	25
17	5	20	32	31	28	27	13	28	17

(i) What is the range of these marks? 32 − 5 = 27

Highest − Lowest

.....

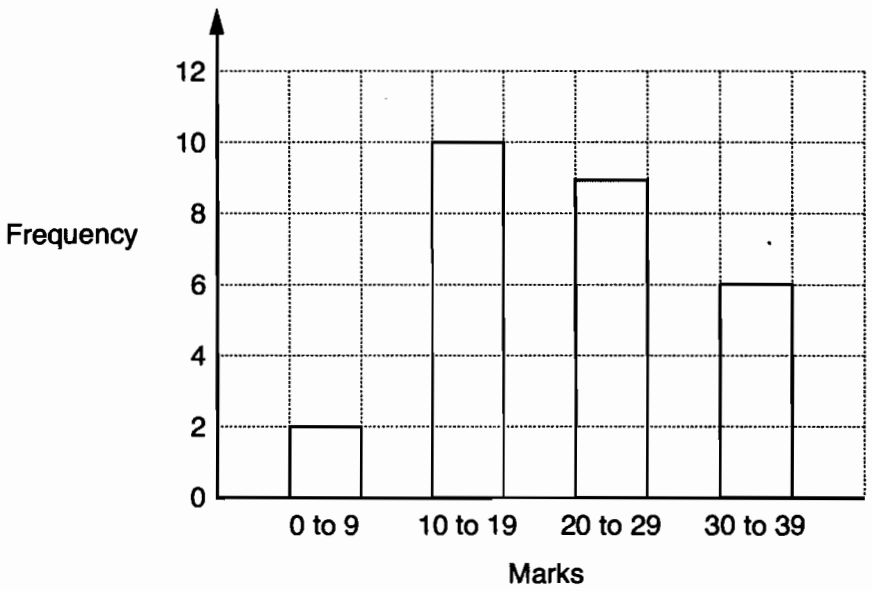
(a)(i) 27 **[1]**

(ii) Complete the frequency table to show the marks for class 9R.

Mark	Tally	Frequency
0 to 9	IIII	4
10 to 19	𝍸 IIII	9
20 to 29	𝍸 𝍸 I	11
30 to 39	𝍸 I	6

[2]

This bar chart shows the marks for class 9T in the History test.



(b) (i) What is the mode for this bar chart?

Most often

(b)(i) 10 to 19 **[1]**

(ii) Explain why the **actual** range of marks for students in class 9T cannot be found from the bar chart.

Do not know the actual highest and lowest scores, only what groups they are in **[1]**

5 (a) Write 50% as a decimal.

(a) 0·5 **[1]**

(b) Write $\frac{3}{4}$ as a decimal.

(b) 0·75 **[1]**

(c) Write 25% as a fraction.

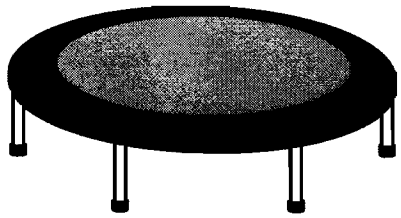
$\frac{25}{100} = \frac{1}{4}$

(c) $\frac{1}{4}$ **[1]**

(d) Write 0.3 as a percentage.

(d) 30 % **[1]**

6 **(a)** Sam and Lizzie have a trampoline.
Sam does 6 jumps every ten seconds.
Lizzie does 5 jumps every ten seconds.
Sam jumps for 2 minutes and then Lizzie jumps for 1 minute.



How many jumps do they do altogether?

SAM 6 in 10s ⇒ 6×6 = 36 in a min ⇒ 72 in 2min

LIZZIE 5 in 10s ⇒ 5×6 = 30 in a min

72 + 30 = 102

(a) 102 **[4]**

(b) Lizzie can do 3 types of jump:

- Sitting jumps (S)
- Kneeling jumps (K)
- Upright jumps (U)

Sam can do 2 types of jump:

- Sitting jumps (S)
- Kneeling jumps (K)

They each demonstrate one type of jump to a friend.

(i) Complete this table to show the different combinations of jumps they could do.
The first row is done for you. You may not need all the rows.

Lizzie	Sam
S	S
S	K
K	S
K	K
U	S
U	K

6 possibilities

[2]

(ii) Sam and Lizzie decide what jump to do at random.

What is the probability that they choose to do the same jump?

$\frac{2}{6} = \frac{1}{3}$

(b)(ii) $\frac{1}{3}$ (or $\frac{2}{6}$) **[2]**

7 **(a)** Write 7.777 correct to 1 decimal place.

(a) 7.8 [1]

(b) **Estimate** the value of $\sqrt{40}$.

$\sqrt{36} = 6$

$\sqrt{49} = 7$

(b) 6.3 [1]

(c) Calculate.

684 ÷ 18

$1 \times 18 = 18$
$2 \times 18 = 36$
$3 \times 18 = 54$
$4 \times 18 = 72$
$5 \times 18 = 90$
$6 \times 18 = 108$
$7 \times 18 = 126$
$8 \times 18 = 144$
$9 \times 18 = 162$
$10 \times 18 = 180$

$$18\overline{)684}$$

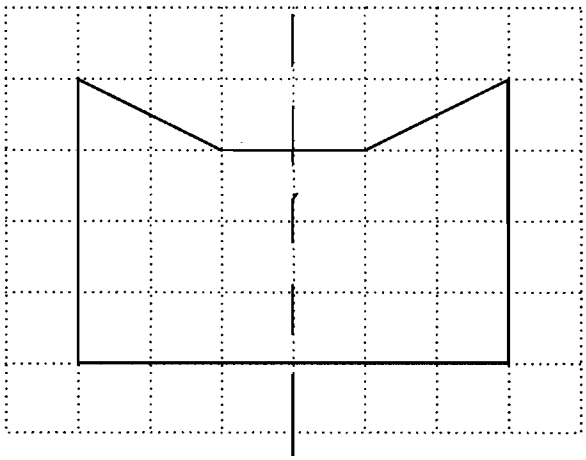
38
54
144
144

Could also divide by 2 then divide by 9 since $18 = 2 \times 9$

$$2\overline{)684} \quad 342 \qquad 9\overline{)342} \quad 38$$

(c) 38 [3]

8 (a)



The shape above is drawn on a centimetre grid.

(i) Find the area of the shape .

18 whole boxes + extra 2 from triangle at top

(a)(i) 20 cm^2 **[1]**

(ii) Draw the line of symmetry on the shape. **[1]**

(b) A rectangle has area 24 cm^2.

(i) Write down one pair of possible values for its length and width.

(b)(i) Length 12 cm and width 2 cm **[1]**

(ii) Work out the perimeter of your rectangle.

12 + 12 + 2 + 2

(ii) 28 cm **[1]**

if you said 6x4 perimeter 20cm

if you said 8x3 perimeter 18 cm

(c) There is a square where the value of its area (in cm^2) is the same as the value of its perimeter (in cm).

Find the length of a side of this square.

Area Perimeter

1×1 1 4

2×2 4 8

3×3 9 12

4×4 16 16 ✓

(c) 4 cm **[2]**

9 **(a)** Simplify.

(i) $6r - 2r$

(a)(i) $4r$ **[1]**

(ii) $7v + 5w + 3v + w$

(ii) $10v + 6w$ **[2]**

(b) Solve.

(i) $10x = 50$ $x = \frac{50}{10}$

(b)(i) $x = 5$ **[1]**

(ii) $2y - 7 = 10$ $2y = 10 + 7$

$2y = 17$

$y = \frac{17}{2}$

$y = 8.5$

(ii) $y = 8.5$ **[2]**

10 (a) 68° is an example of an **acute** angle.

Write down an example of a **reflex** angle.

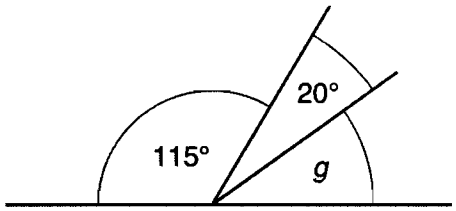
Answer between 181 and 359° will do

(a) 200° [1]

(b) **Measure** the size of the angle marked *f*.

(b) 168° [1]
(166 - 170 allowed)

(c)



NOT TO SCALE
so do not use protractor!

Calculate the size of angle *g*.
Give a reason for your answer.

115° + 20° = 135°

180° − 135° = 45°

g = 45° ° because angles on a straight line add up to 180° [2]

11 A box contains 15 organic vegetables.

- 1 marrow
- 1 turnip
- 3 onions
- 6 carrots
- 2 cucumbers
- 2 artichokes

Daljit takes one of the vegetables at random.

What is the probability that she takes

(a) the marrow,

.....

(a) $\frac{1}{15}$ **[1]**

(b) a carrot?
Give your answer as a fraction in its lowest terms. $\frac{6}{15} = \frac{2}{5}$

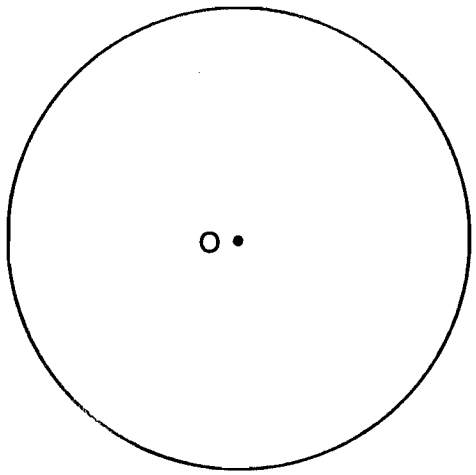
.....

.....

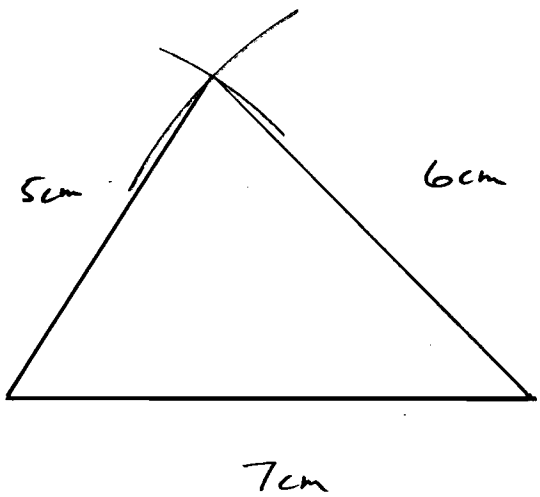
.....

(b) $\frac{2}{5}$ **[2]**

12 (a) Draw a circle, radius 3 cm, with centre O. **[1]**



(b) Use ruler and compasses to construct a triangle with sides 7 cm, 6 cm and 5 cm.
You must show all your construction lines. **[3]**



13 **(a)** Complete this table for $y = x + 1$.

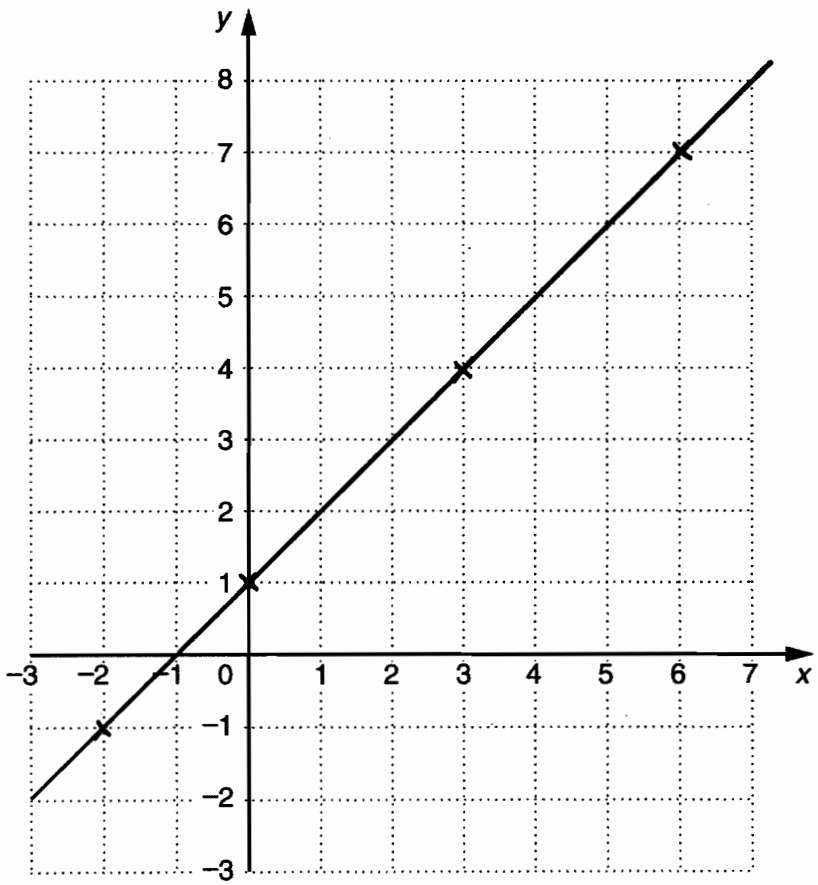
.....

.....

x	–2	0	3	6
y	–1	1	4	7

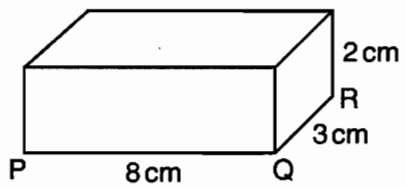
[2]

(b) On the grid, draw the graph of $y = x + 1$ for x from –2 to 6.

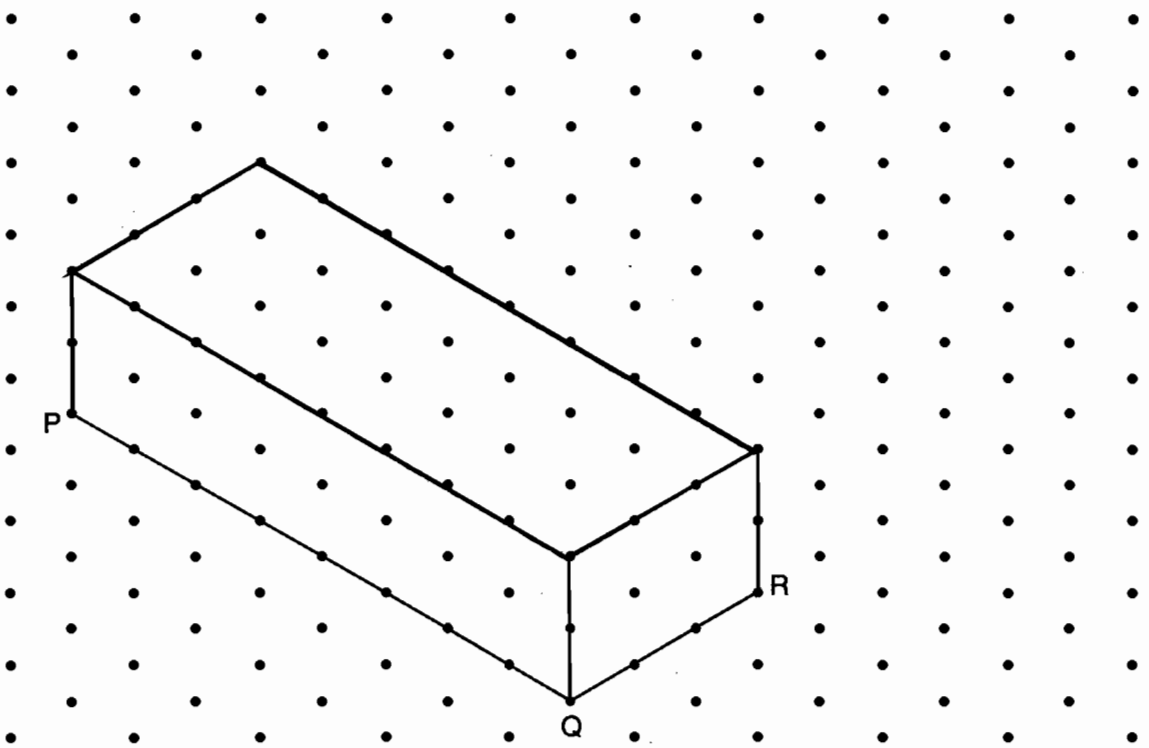


[2]

14 This is a sketch of a cuboid.



(a) On the grid, draw a full-size isometric diagram of the cuboid.
The lines PQ and QR have been drawn for you.



[2]

(b) Calculate the volume of the cuboid.
Give the units of your answer.

Length x Width x Height

8 x 3 x 2 = 48 cm³

(b) 48 cm³ **[3]**

15 Solve these equations.

(a) $\frac{3x}{4} = 6$

$3x = 6 \times 4$

$3x = 24$

$x = \frac{24}{3}$

$x = 8$

(a) $x = 8$ **[2]**

(b) $5(2x + 1) = 20$

$10x + 5 = 20$

$10x = 20 - 5$

$10x = 15$

$x = \frac{15}{10}$

$x = 1.5$

(b) $x = 1.5$ **[3]**

16 (a) Show that $\frac{13}{50}$ is the same as 26%. $\frac{13}{50} = \frac{26}{100} = 26\%$

[1]

(b) By writing each of these three fractions as percentages, arrange them in order, smallest first.

$\frac{7}{20}$ $\frac{13}{50}$ $\frac{90}{300}$

Show your working clearly.

$\frac{7}{20} = \frac{35}{100} = 35\%$ biggest

$\frac{13}{50} = \frac{26}{100} = 26\%$ smallest

$\frac{90}{300} = \frac{30}{100} = 30\%$ middle one

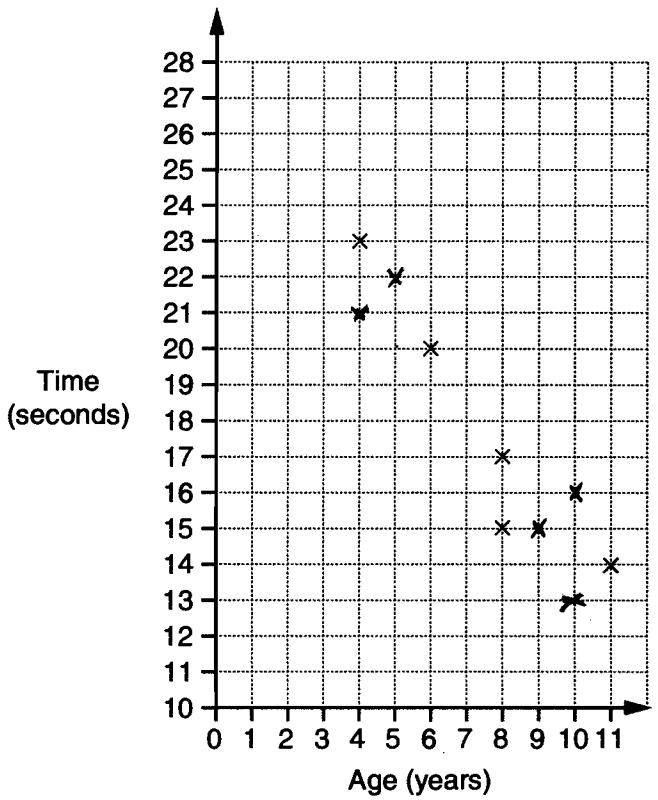
(b) $\frac{13}{50}$ $\frac{90}{300}$ $\frac{7}{20}$ [3]

smallest

17 There are 10 children in a junior swimming club.
The table shows each child's age and their time to swim 30 metres.

Age (years)	8	4	11	8	6	10	5	4	9	10
Time (seconds)	17	23	14	15	20	13	22	21	15	16

(a) Complete the scatter diagram.
The first 5 points have already been plotted.



[2]

(b) Describe the correlation shown in the scatter diagram.

negative correlation **[1]**

18 Ready salted crisps can be bought in

a pack of 6 bags for £1.38 = 138p
or a pack of 10 bags for £2.20. = 220p

(a) Which of these two packs is better value for money?
Show your working clearly.

23
6|138

220 ÷ 10 = 22p per bag

23p per bag

so 10 bag pack cheaper

(a) 10 bag pack [3]

(b) A family pack contains only bags of smokey bacon crisps and bags of cheese and onion crisps.
The ratio of bags of smokey bacon to bags of cheese and onion is 3 : 2.

(i) Phil says that each family pack contains 3 bags of smokey bacon crisps and 2 bags of cheese and onion crisps.

Explain why Phil may be wrong.

3:2 is the ratio not the number of bags

Could be 6 smokey bacon and 4 cheese+onion for example. [1]

(ii) Some family packs are opened and all the bags of crisps put into an empty container.
There are 160 bags of crisps altogether in the container.

How many bags of each flavour are there?

160 = (3+2) = 5 parts

5|160
32

1 part = 32 bags

3 × 32 = 96 2×32 = 64

(b)(ii) smokey bacon 96

cheese and onion 64 [3]

19 A ball is thrown into the air.
The height, h metres, of the ball above the ground after a time t seconds is given by

$$h = 25t - 5t^2.$$

(a) Complete the table of values.

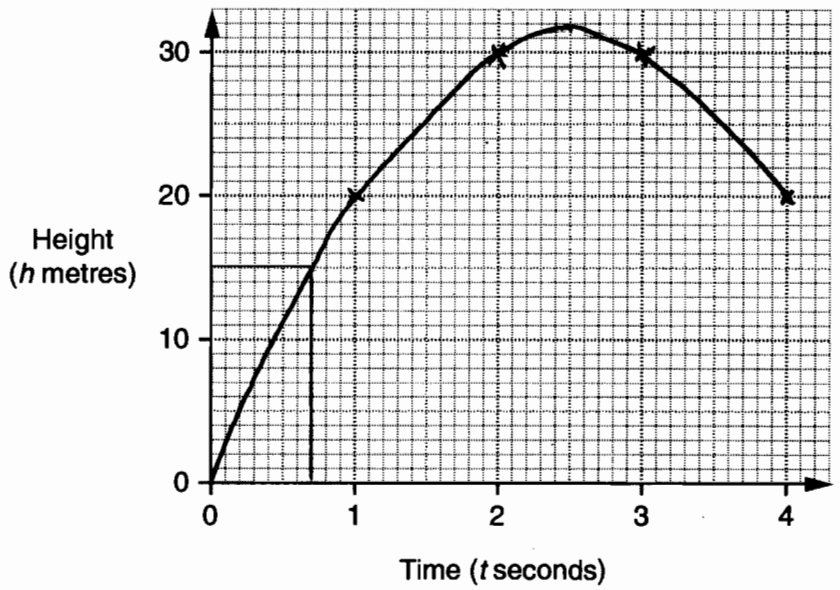
$25(1) - 5(1)^2 = 25 - 5 = 20$

$25(2) - 5(2)^2 = 50 - 20 = 30$

t	0	1	2	3	4
h	0	20	30	30	20

[2]

(b) Draw the graph of $h = 25t - 5t^2$ for t from 0 to 4.



[2]

(c) Use your graph to estimate

(i) the maximum height of the ball above the ground,

(c)(i) 32 m **[1]**

(ii) the time when the ball is 15 m above the ground.

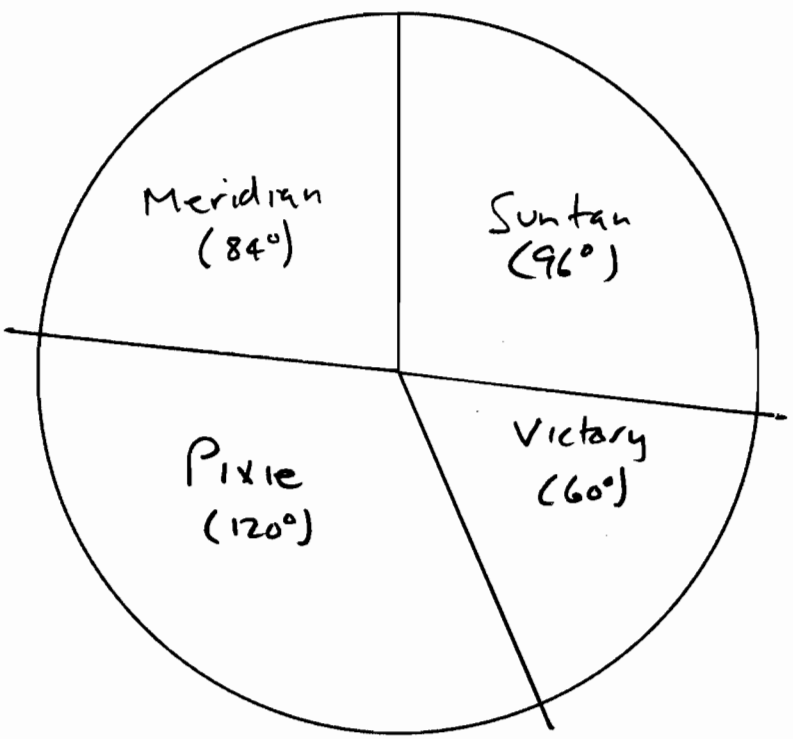
(ii) 0·7 s **[1]**

20 (a) In an orchard there are 90 English apple trees.
The table below shows the number of each type of tree.

Type of tree	Frequency	Angle Freq × 4
Suntan	24	96
Victory	15	60
Pixie	30	120
Meridian	21	84
	Total = 90	

Draw and label a pie chart to show this information. $\frac{360}{90} = 4$

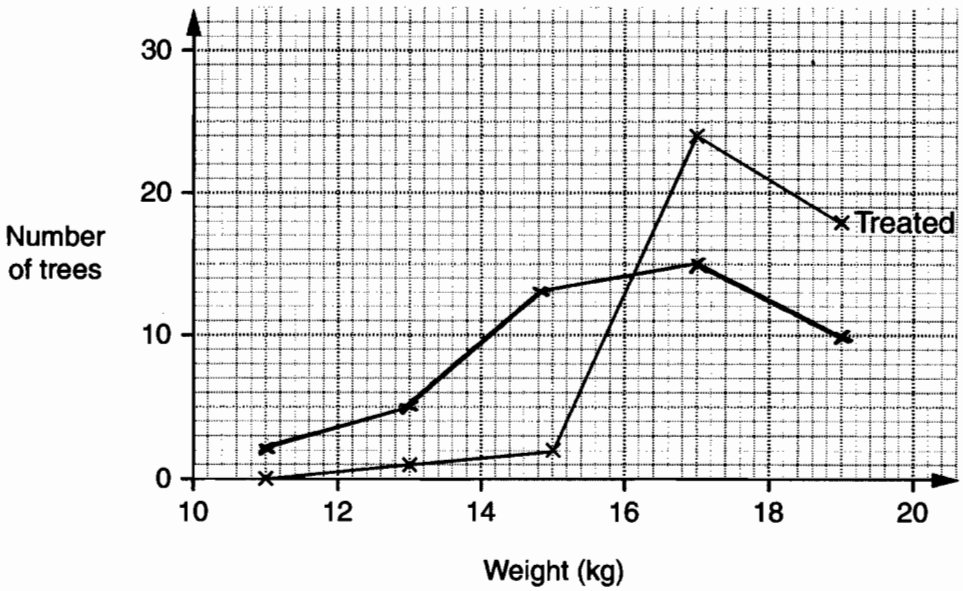
Each tree is 4° of Pie



[4]

(b) In an experiment on pest control and the production of fruit, 45 apple trees were treated with a pesticide and 45 other apple trees were left untreated.
When the apples were picked, the total weight of apples from each tree was recorded.

The frequency polygon shows the distribution of weights of apples from the **treated** trees.



(i) The table shows the distribution of weights of apples from the **untreated** trees.

Weight ($w$kg)	$10 < w \leqslant 12$	$12 < w \leqslant 14$	$14 < w \leqslant 16$	$16 < w \leqslant 18$	$18 < w \leqslant 20$
Number of trees	2	5	13	15	10

On the grid above, draw the frequency polygon for these data. **[2]**

(ii) Make one comment to compare the two distributions.

More treated trees had weights of apples over 16 kg than untreated trees **[1]**