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Mark Scheme (Results)

November 2012

GCSE Mathematics (Linear) 1MA0
Foundation (Calculator) Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

<table>
<tr><th colspan="6">1MA0_2F</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>3600</td><td>1</td><td>B1 for 3600</td></tr>
<tr><td></td><td>(b)</td><td></td><td>1.8</td><td>1</td><td>B1 for 1.8</td></tr>
<tr><td></td><td>(c)</td><td></td><td>3.6 shown</td><td>1</td><td>B1 for 3.6 marked on number line</td></tr>
<tr><td>2</td><td>(a)</td><td><table><tr><td>Fruit</td><td>Tally</td><td>Freq</td></tr><tr><td>Currant</td><td>𝍸</td><td>5</td></tr><tr><td>Prune</td><td>𝍸</td><td>5</td></tr><tr><td>Raisin</td><td>𝍸 |</td><td>6</td></tr><tr><td>Sultana</td><td>𝍸 |||</td><td>8</td></tr></table></td><td>Correct tally</td><td>2</td><td>M1 for at least 2 tallies or frequencies correct
A1 for 4 correct frequencies</td></tr>
</table>

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
2	(b)	Angles: Currants (75°) Prunes (75°) Raisins (90°) Sultanas (120°)	Diagram drawn	3	M1 for bar chart or other suitable chart with at least 2 correct heights for their scale or ft from (a) M1 for all bars correctly labelled and vertical axis correctly scaled A1 for fully correct bar chart or ft from (a) OR M1 for pictogram, at least 2 correct rows or ft from (a) M1 for correct labels on all rows and key A1 for fully correct pictogram or ft from (a) OR M1 for stick graph with at least 2 sticks of correct height for their scale or ft from (a) M1 for all sticks correctly labelled and vertical axis correctly scaled A1 for fully correct stick graph or ft from (a) OR M1 for pie chart with at least 2 correct sectors (±2°) or 2 angles correctly calculated or ft from (a) M1(dep) for all sectors correctly labelled A1 for fully correct pie chart or ft from (a)

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		16 or 4	1	B1 for 4 or 16 (or both)
	(b)		21	1	B1 cao
	(c)		10 or 15	1	B1 10 or 15 (or both)
4	(a)		32 and 10	2	B1 for 32 in the correct place B1 for 10 in the correct place
	(b)	$10\times3\times2=60$ or $10\times3+30=60$	$\times2$ or $+30$	1	B1 for $\times2$ or $+30$
5		$180\times\frac{10}{100}=18$ or $\frac{20}{180}\times100=11.\dot{1}$	No	3	M1 for $180\times\frac{10}{100}$ oe or 180×1.1 oe or $\frac{20}{180}\times100$ $\left(=11.\dot{1}\right)$ oe A1 for (£)18 or (£)198 or 11% C1 (dep M1) for comparison of increases or total pay or percentage increases leading to a correct deduction

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		No + reason	1	B1 for No because she has 1 choice out of 3 which is the same as Mike oe
	(b)	(r,g)(r,b)(g,b)(g,r)(b,g)(b,r) (r,r)(b,b)(g,g)	Complete list	2	M1 for listing pairs (at least 5 correct pairs) A1 for fully correct list (ignore repeats)
	(c)		$\frac{1}{9}$	1	B1 for $\frac{1}{9}$ oe (If M1A0 in (b), then SC B1 in (c) for $\frac{\text{their number of (b,g)}}{\text{their total number of outcomes}}$)
7	(a)	3 4 4 5 5 6 8 9 10	5	2	M1 for ordering the 9 numbers A1 cao
	(b)	(4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4)÷9 54 ÷ 9	6	2	M1 for (4 + 8 + 5 + 9 + 10 + 5 + 6 + 3 + 4) ÷ 9 or 54 ÷ 9 A1 cao
8	(a)		10	1	B1 cao
	(b)		6	1	B1 cao
	(c)		Correct image	2	B2 cao (B1 for reflection in a line parallel to the given line)
9		20 × 20 × 40 = 16000	16000 cm^3	3	M1 for 20 × 20 × 40 or 0.2 × 0.2 ×0.4 A1 for for 16 000 or 0.016 B1 for cm^3 or m^3 (consistent with working)

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)	30 + 8×4	62	2	M1 for 30 + 8×4 or attempt to add four 8s to 30 (allow one error in addition) A1 cao
	(b)	110 – 30 = 80 80÷8 = 10 **OR** 110 – 62 = 48 48÷8 = 6 4 + 6 = 10	10	3	M1 for 110 – 30 (=80) M1 (dep) for '80' ÷ 8 or A1 cao OR M1 for 110 – 62 (= 48) M1(dep) for '48'÷8 = 6 A1 cao
11	(a)		cm gallons	2	B1 for centimetres or cm or millimetres or mm B1 for gallons (accept pints)
	(b)(i)		4000	2	B1 cao
	(ii)		3.5		B1 for 3.5 oe
12		3 ×9.58 + 12.61 + 7.06 + 4.41 (= 52.82)	Yes + working	4	M2 for 3 ×9.58 (=28.74) + 12.61 + 7.06 + 4.41 or 55 − 3 ×9.58 (=28.74) − 12.61 −7.06 − 4.41 (M1 for at least 2 correct costs seen) A1 for 52.82 or 2.18 C1 (dep M1) for comparison and correct deduction using their total cost or amount left

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		A and C	1	B1 for A and C (no extras)
	(b)		B or E	1	B1 for B or E (or both) (no extras)
	(c)		2	1	B1 cao
14		$3 \times 4 = 12$ $12\ m^2 = 120000\ cm^2$ $20 \times 20 = 400$ $120000 \div 400 = 300$ $300 \div 10 = 30$ **OR** 3m = 300cm, 4 m = 400cm $300 \div 20 = 15$, $400 \div 20 = 20$ $15 \times 20 = 300$ $300 \div 10 = 30$ $30 \times 34.99 = 1049.70$	No with working	6	B1 for a correct conversion of 3 m or 4 m to cm or 20 cm to m or a correct and appropriate area conversion. M1 for 300×400 (=120000) or 3×4 (=12) M1 for 20×20 or 0.20×0.20 M1 for '120000'÷ '400' or '12' ÷ '0.04' A1 for 1049.7(0) C1 (dep M1) for comparison and correct deduction using their total cost with supportive working OR B1 for a correct conversion of 3 m or 4 m to cm or 20 cm to m or a correct and appropriate area conversion. M1 for $300 \div 20$ or $400 \div 20$ or $3 \div 0.2(0)$ or $4 \div 0\ 2(0)$ M1 for $300 \div 20$ and $400 \div 20$ or $3 \div 0.2(0)$ and $4 \div 0\ 2(0)$ M1 for '15' × '20' A1 for 1049.7(0) C1 (dep M1) for comparison and correct deduction using their total cost with supportive working

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)		Correct net	1	B1 for correct net
	(b)	Shade two faces. For each correct net there are 3 different possibilities	Correct shading	1	B1 for shading 2 opposite faces
	(c)		12	1	B1 cao
16		Paint R Us 6×2.19 (= 13.14) Deco Mart 9×1.80 (= 16.20) 16.20×0.9 (= 14.58)	Paint R Us	6	Paint R Us M1 for '$9 - 3$' $\times 2.19$ A1 for 13.14 Deco Mart M2 for $\frac{90}{100}$ × '16.20' oe (M1 for $\frac{10}{100}$ × '16.20' oe) A1 for 14.58 C1 (dep M1) for comparison of cost of 9 tins at Paint R Us with cost of 9 tins at Deco Mart leading to a correct deduction

1MA0_2F

Question		Working	Answer	Mark	Notes
17		<table><tr><th>Bird</th><th>Frequency</th><th>Angles</th></tr><tr><td>Magpie</td><td>15</td><td>75</td></tr><tr><td>Thrush</td><td>10</td><td>50</td></tr><tr><td>Starling</td><td>20</td><td>100</td></tr><tr><td>Sparrow</td><td>27</td><td>135</td></tr></table> Angles $\frac{15}{72}\times 360$, $\frac{10}{72}\times 360$, $\frac{20}{72}\times 360$, $\frac{27}{72}\times 360$ **OR** $\frac{75}{15}\times 10, \frac{75}{15}\times 20, \frac{75}{15}\times 27$	Correct pie chart	3	M1 for any one of $\frac{15}{'72'}\times 360$, $\frac{10}{'72'}\times 360$, $\frac{20}{'72'}\times 360$, $\frac{27}{'72'}\times 360$ oe ('72' must clearly come from adding frequencies) A1 for 75 seen from correct working or 50 seen **or** 100 seen **or** 135 seen **or** one sector of angle 50^o or 100^o or 135^o labelled correctly with bird's name **or** all sectors correctly drawn A1 for correct pie chart fully labelled with birds' names OR M1 for $\frac{'75'}{15}\times 10$ **or** $\frac{'75'}{15}\times 20$ **or** $\frac{'75'}{15}\times 27$ ('75' must be in the range 73 - 77) A1 for 50 seen **or** 100 seen **or** 135 seen **or** one sector of angle 50^o or 100^o or 135^o labelled correctly with bird's name **or** all sectors correctly drawn A1 for correct pie chart fully labelled with birds' names NB. Allow a tolerance of $\pm 2^o$ on all drawn angles

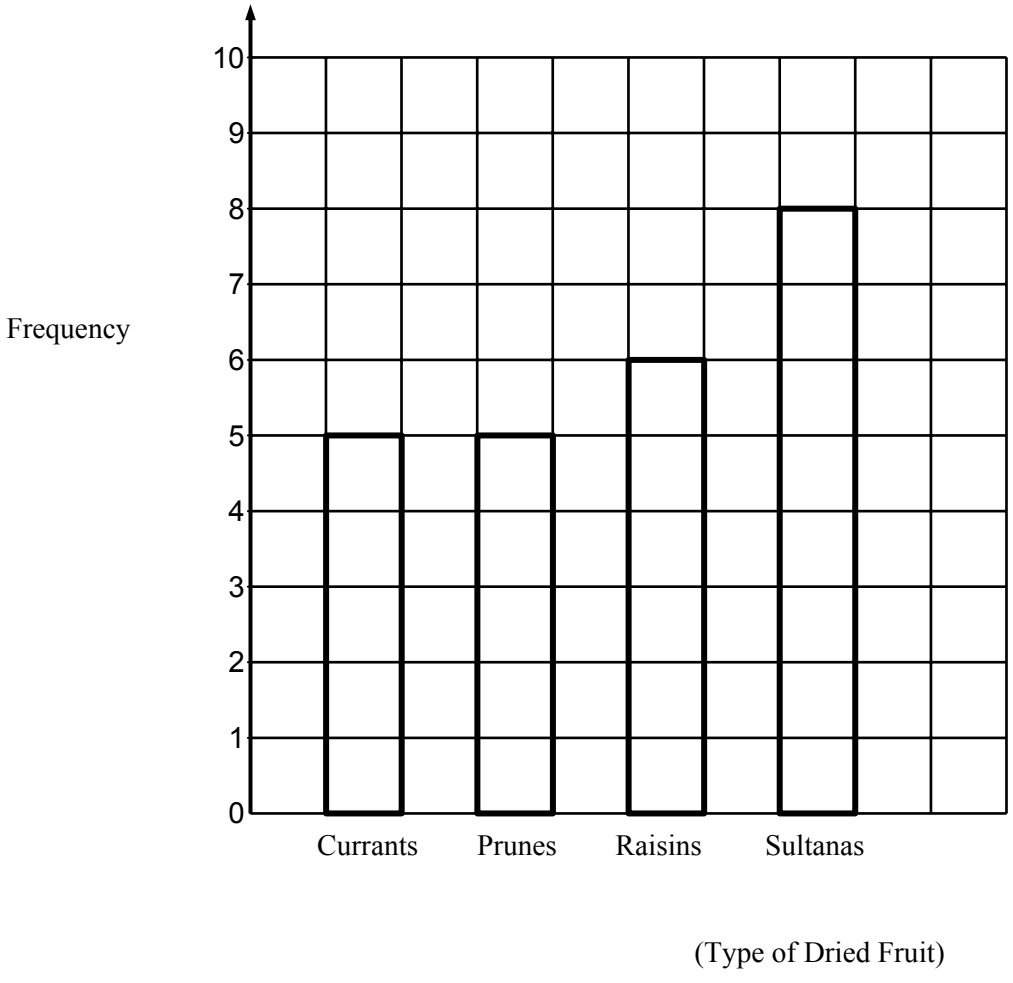
1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
18	(a)	$y = 4 \times 7.5 + 5.4$	35.4	2	M1 for $4 \times 7.5 + 5.4$ A1 cao
	(b)	$18.8 = 4x - 2.4$ $x = \frac{18.8 + 2.4}{4}$	5.3	2	M1 for intention to add 2.4 to 18.8 or to subtract -2.4 from 18.8 or to divide 18.8 and (-)2.4 by 4 A1 cao
19		180÷30 = 6 9 + 6 + 0.5+0.5 = 16	16:00 or 4pm	3	M1 for 180÷30 (= 6) or 30 + 30 +…to a total of between 150 and 210 exclusive M1 for 9 + '6' + 0.5 + 0.5 A1 for 16:00 or 4pm (accept 4 o'clock) OR M1 for 60 bricks used or 120 bricks left at 11 am M1 for 45 bricks used between 11 30 am and 1 pm or 75 bricks left at 1 pm A1 for 16:00 or 4pm (accept 4 o'clock) (SC B1 for 3 pm or 3 30pm if M0 scored) (SC B1 for 7 hours needed if M0 scored)
20		$\frac{\sqrt{20.4}}{6.2 \times 0.48} = \frac{4.5166359}{2.976}$	1.5176(868)	2	B2 for 1.5176… (B1 for sight of 4.51(66359..) **or** 4.52 **or** 2.976 **or** 2.98 **or** 1.51 **or** 1.52 **or** 1.518 **or** or 1.517 **or** 1.5177 **or** $\frac{\sqrt{510}}{5}$)

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
21	(a)		56	1	B1 for 56 (accept answer in the range 55 to 57)
	(b)	Barry's Bricks £50 Bricks ArUs £65 65 − 50	15	3	M1 for 50 or 65 (accept 64 – 66) M1 for 65 – 50 (accept 64-66 for 65) A1 for 15 (accept answer in range 14 to 16)
22	(a)	1 – 0.7	0.3	2	M1 for 1 – 0.7 A1 for 0.3 oe
	(b)	200 ×0.7	140	2	M1 for 200 ×0.7 A1 for 140
23		25 ÷ 50 = 0.5 h = 30 min 25 ÷ 60 = 0.416 h = 25 min	5	3	M1 for 25 ÷ 50 **or** $\frac{60}{50}\times 25$ **or** 30 (min) **or** 0.5(h) **or** 25 ÷ 60 **or** $\frac{60}{60}\times 25$ **or** 25 (min) **or** 0.41(6)(h) M1(dep) '0.5' –'0.41(6)'**or** '30' – '25' A1 cao OR M1 for 60 ÷ 25 (= 2.4) and 60 ÷ "2.4" **or** 50 ÷ 25 (= 2) and 60 ÷ "2" M1(dep) for '30' – '25' A1 cao

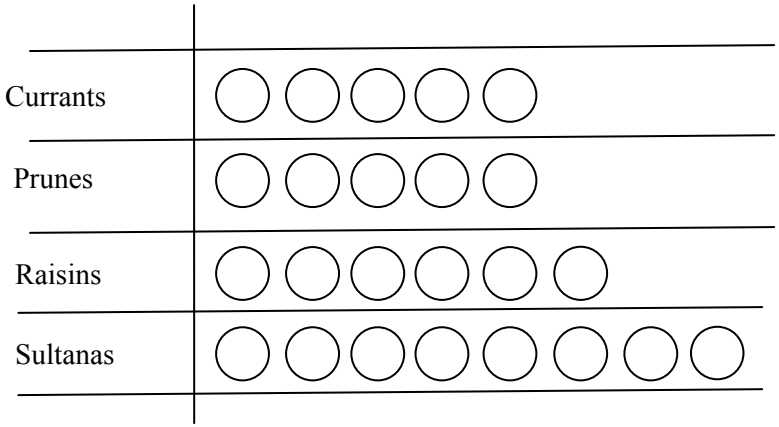
1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24		Angle DEC = 180 – 41 =139 Angles on a straight line sum to 180^o Angle EDC = 60 – 38 **or** Angle ABD = 180 – 120 – 38 (=22) Co-interior/Allied angles of parallel lines sum to 180^o **or** Angles in a triangle sum to 180^o **and** Alternate angles x =)180 – '139' – '22' (=19) Angles in a triangle sum to 180^o **OR** Angle ADC = 180^o – 120^o = 60^o Co-interior/Allied angles of parallel lines sum to 180^o Angle EDC = 22^o Angle ECD = 41^o – 22^o = 19^o Exterior angle of triangle equals sum of the two opposite interior angles **OR** Angle DBC = 38^o Alternate angles Angle BCE = 101^o Angle sum of a triangle is 180^o Angle BCD = 120^o Opposite angles of a parallelogram are equal Angle ECD = 120^o – 101^o = 19^o	x = 19^o and reasons	4	M1 for DBC = 38^o **or** ADC = 60^o(can be implied by BDC = 22^o) **or** ABC = 60^o **or** DCB = 120^o **or** (ABD =) 180 – 120 –38 (=22) M1 for (BDC =) 60 − 38 (=22) **or** BDC = '22' **or** (DEC =) 180 − 41 (=139) **or** (BCE =) 180 −41 − 38 (=101) M1 (dep on both previous M1) for complete correct method to find x **or** (x =) 19 C1 for x = 19^o **AND** Co-interior/allied angles of parallel lines sum to 180^o **or** Opposite angles of a parallelogram are equal **or** Alternate angles **AND** Angles on a straight line sum to 180^o **or** Angles in a triangle sum to 180^o **or** Exterior angle of triangle equals sum of the two opposite interior angles **or** Angles in a quadrilateral sum to 360^o

1MA0_2F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		–1, 0, 1, 2, 3	2	B2 for all 5 correct values; ignore repeats, any order (B1 for 4 correct (and no incorrect values) eg. 0, 1, 2, 3 **or** one additional value, eg –1, 0, 1, 2, 3, 4)
	(b)		$-4 < x \leq 3$	2	B2 for $-4 < x \leq 3$ **or** > -4 **and** ≤ 3 (B1 for $-4 < x$ **or** $x > -4$ **or** $x \leq 3$ **or** $3 \geq x$ **or** > -4 **or** ≤ 3 **or** $-4 \leq x < 3$) (NB Accept the use of any letter)
	(c)	$3y - 2 > 5$ $3y > 7$	$y > \frac{7}{3}$	2	M1 for clear intention to add 2 to both sides (of inequality or equation) or clear intention to divide all terms by 3 **or** $3y > 7$ **or** $3y < 7$ **or** $3y = 7$ A1 $y > \frac{7}{3}$ **or** $y > 2\frac{1}{3}$ **or** $y > 2.\dot{3}$ NB. final answer **must** be an inequality (SC B1 for $\frac{7}{3}$ oe seen if M0 scored)
26	(a)		$2(2x + 5y)$	1	B1 cao
	(b)		$x(x + 7)$	1	B1 cao
27		Triangle at (–2, 2), (–2, 0),(–1,–1)	Correct figure	2	M1 for any translation A1 for correct translation

2

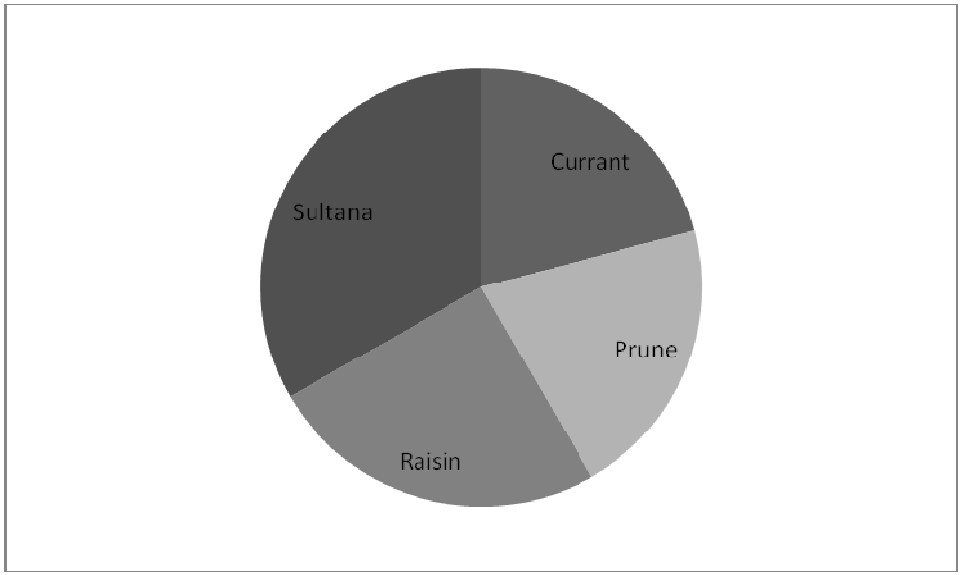

Frequency
10
9
8
7
6
5
4
3
2
1
0
Currants
Prunes
Raisins
Sultanas
(Type of Dried Fruit)

2 (alt)

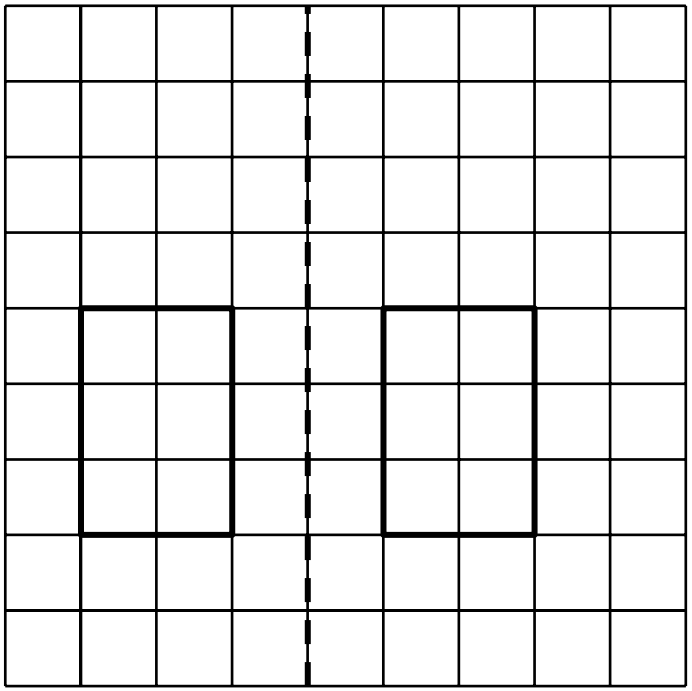


Key: ◯ = 1 person

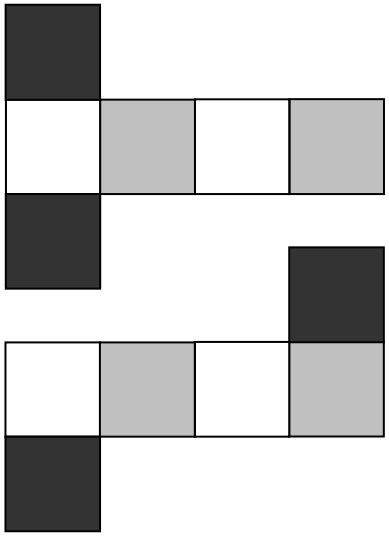
2 (alt)

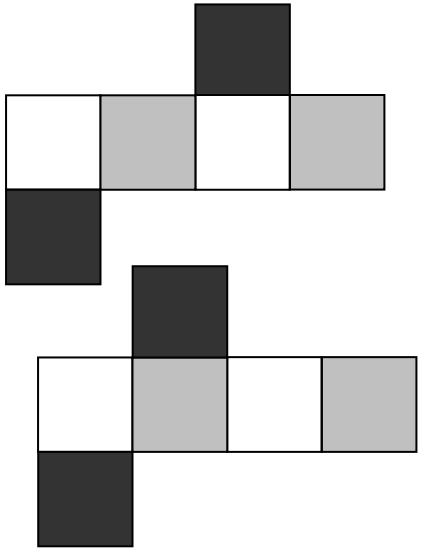


8

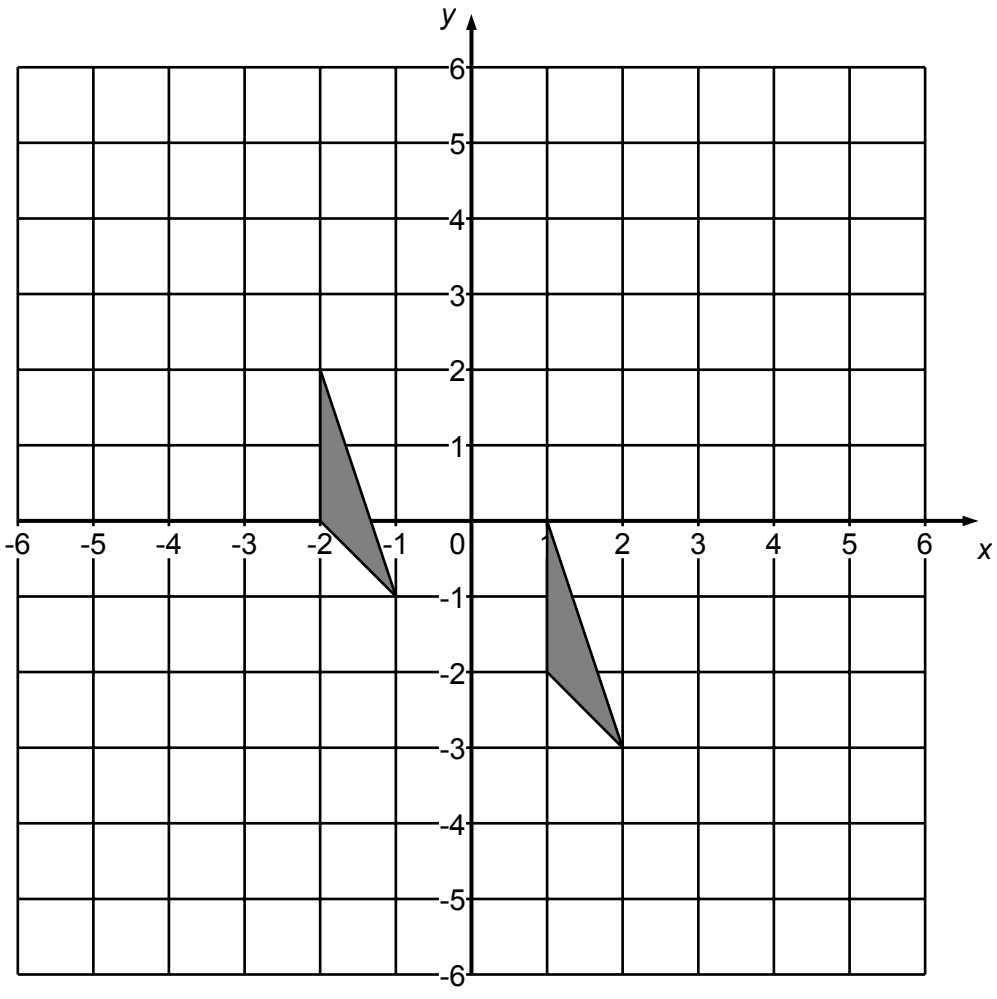


15b and c





27



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