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Mark Scheme (Results)

Summer 2024

Pearson Edexcel International GCSE In Mathematics A (4MA1) Paper 2F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- 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.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response

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- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - awrt – answer which rounds to
  - eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks

  If no working is shown then incorrect (even though nearly correct) answers score no marks.
- **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 it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.

  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.

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

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- **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: eg. Incorrect cancelling 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 eg algebra.

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

- **Parts of questions**

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

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International GCSE Maths

Apart from questions 20 and 26 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.
Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise.

Q	Working	Answer	Mark	Notes
1		A fully correct bar chart	3	B2 All bars of correct height according to their scale (B1 for 3, 4 or 5 bars of the correct height or B1 for all heights marked but no bars drawn) condone gaps or no gaps between bars and also bars of different widths B1 All labels correct (linear scale for numbers and individual labels for names)
				Total 3 marks

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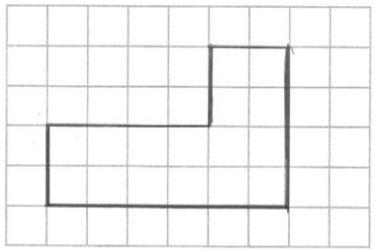
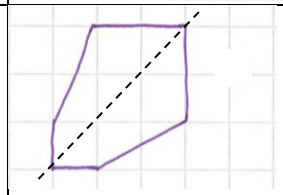
2	(a)		Correct congruent shape	1	B1	A shape of the same size and shape as given (can be reflected or rotated)
	(b)	eg 	Correct enlargement	2	B2	A shape that is an enlargement of the given shape (B1 for 2 correctly enlarged sides) Any orientation is satisfactory
	(c)		correct line	1	B1	correct line with no other lines
	(d)		14	1	B1	
	(e)		8	1	B1	
						Total 6 marks

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3	(a)		–89, –77, –6, 39, 43	1	B1
	(b)		0.017, 0.12, 0.134, 0.145, 0.3	1	B1 Allow extra zeros eg 0.017, 0120, 0.134, 0.145, 0.300
	(c)		70	1	B1
	(d)		0.27	1	B1
	(e)	$1-\frac{7}{10}(=\frac{3}{10}=0.3=30\%)$ or $\frac{7}{10}\times 60\ (=42)$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	18		A1
					Total 6 marks

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4	(a)(i)		71	1	B1	
	(ii)	Allow "decreasing by –7 "	–7	1	B1	oe eg 'take 7'or 'subtract 7' each number is going down by 7 78 – 7 $-7n + 113$ $-7 \times \mathbf{6} + 113$ If words used, please accept incorrect spelling if meaning is clear
	(b)		29	1	B1	
	(c)	**Acceptable** 1. The numbers are not in the 7 times table 2. It isn't going down by the multiples of 7 3. 8 is in the sequence but not 7 4. It starts from 1 and you keep adding on 7 5. 15 – 7 = 8 6. The sequence is the 7 times table plus 1 7. Should be 8 8. 15 – 7 does not equal 7 **Not acceptable** 1. Because 7 won't make the sequence correct 2. 7 isn't in the sequence 3. Umberto is wrong 4. Because if you keep going down in 7s you will get to 9 (or 6 etc…ie they are incorrect) 5. It will pass 7	Correct reason	1	B1	eg the sequence is $-7n + 113$ or it goes ....15, 8, (1...) oe
						Total 4 marks

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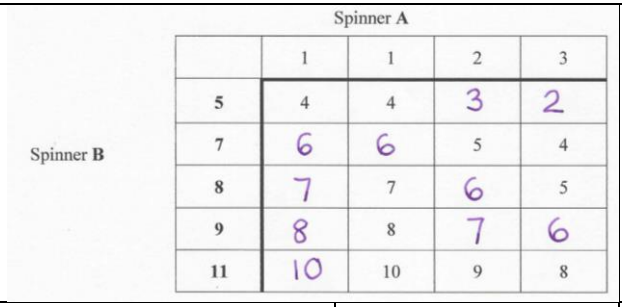
5 (a)			2	B2	All correct (B1 for 5, 6, 7, 8 or 9 values completed correctly)
(b)(i)		$\frac{13}{20}$	1	B1ft	oe 0.65 or 65% or ft from a completed table
(ii)		$\frac{6}{20}$	1	B1ft	oe 0.3 or 30% or ft from a completed table penalise incorrect notation only once penalise the incorrect denominator only once (as long as denominator > 13 and is the same in b(i) and b(ii))
					Total 4 marks

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6	19 + 32 + 3 (= 54) or 150 – 19 – 32 – 3 (= 96)		3	M1 or $\frac{54}{150}$
	$\frac{150-'54'}{150}$ $\left(=\frac{'96'}{150}\right)$ assumes previous M1			M1 or any correct fraction not in simplest form or for $\frac{9}{25}$
	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{16}{25}$		A1 (SCB2 for 0.64 or 64% if no other marks scored, B1 for 0.36 or 36% if no other marks scored)
				Total 3 marks

7	350 m*l* written as 0.35 (*l*) or 700 m*l* written as 0.7 (*l*) or 2.8 *l* written as 2800 (m*l*)		4	B1 correct conversion (could be implied by further working)
	2.8 – 2 × "0.35" (=2.1) or "2800" – 2 × 350 (=2100) or 2 × 350 + 5*y* = 2800 oe or 2 × 0.35 + 5*y* = 2.8 oe			M1 Also award for $\frac{2.8-"0.35"}{5}$ or $\frac{2800-"350"}{5}$
	$\frac{"2800"-"700"}{5}$ or $\frac{2.8-"0.7"}{5}$ or $\frac{"2.1"}{5}$ or $\frac{"2100"}{5}$			M1 or for an answer of 0.42(0)
	Correct answer scores full marks (unless from obvious incorrect working)	420		A1
				Total 4 marks

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8	BC: eg 3 for 8.40, 6 for 16.80, etc (at least 2 multiples of 8.40 with number of tins bought) **or** (pay for) $\frac{2}{3}\times 30(=20)$ **or** $\frac{2}{3}\times 4.20\ (=2.80)$ **or** $\frac{2}{3}\times 30\times 4.2(0)\ (=84)$ oe AS: eg $0.25\times 18\ (=4.5)$ **or** $0.75\times 18\ (=13.5)$ **or** $\frac{18}{5}\times 0.75(=2.70)$ **or** $\frac{30}{5}\times 18\times 0.75\ (=81)$ oe		4	M1	For working with Bargain Crafts 3 for 2 offer or working with 25% off offer for Art's Store
	(BC =) 84 or (AS =) 81			A1	For one correct amount
	"84" – "81" (both values must come from correct working)			M1	A fully correct method to find the difference.
	Correct answer scores full marks (unless from obvious incorrect working)	3		A1	allow –3
					Total 4 marks

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9	$\pi \times 9^2$ oe		2	M1	(use of π, 3.14, 3.142, $\frac{22}{7}$ multiplied by radius squared)
	Correct answer scores full marks (unless from obvious incorrect working)	254		A1	254 - 255
					Total 2 marks

10		A rectangle with area 24 cm²	2	B2	For a correct rectangle eg 2 squares by 12 squares, 3 squares by 8 squares, 4 squares by 6 squares, 5 squares by 4.8 squares etc (B1 for stating 24 or drawing any rectangle)
					Total 2 marks

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11	(a)		e^5	1	B1	
	(b)		$3m$	1	B1	
	(c)		$6g^2$	1	B1	
	(d)		$a^2 + 8a$	1	B1	
	(e)		$5(3x + 4)$	1	B1	
	(f)		$T = 3d + 5h$	3	B3	Allow $T = d3 + h5$ or $T = d \times 3 + h \times 5$ (B2 for $3d + 5h$ or $T = 3d + xh$ or $T = yd + 5h$ or $T = 5d + 3h$) [where $x \neq 0$ and $y \neq 0$ and can be negative] (B1 for $3d + xh$ or $yd + 5h$ [where $x \neq 0$ and $y \neq 0$ and can be negative] or $5d + 3h$ or for T = an incorrect expression in d and h eg $T = d + h$, $T = d \times h$ etc or $T = 3d$ (+ c) or $T = (k +) 5h$))
						Total 8 marks

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12	12 420 ÷ 54(=230) or 232 × 54 (=12 528)		3	M1	
	232 – "230" (=2) or "12 528" – 12 420(=108)			M1	
	Correct answer scores full marks (unless from obvious incorrect working)	2 (Aus)dollars or 108 rupees		A1	Answer must have correct units which may be shortened eg $ or r (allow incorrect spelling if meaning is clear)
					Total 3 marks

13		*JW, JY, BW, BY, HW, HY, SW, SY*	2	B2	B2 all correct combinations with no repeats and no incorrect combinations (B1 for at least 4 correct combinations ignoring repeats or incorrect combinations)
					Total 2 marks

14	(a)		rotation 180º (or half turn) about (0, 0) or *O* or 'the origin'	2	B1 B1	oe with no mention of reflection, translation, enlargement, move, flip etc (SC B2 for "enlargement centre origin SF – 1") (ignore any reference to clockwise/anticlockwise)
	(b)	(2, –3) (2, –5) (5, –3) (5, –4)	A correct shape	2	B2	(B1 for a 'correct' shape reflected in any horizontal line or a correct reflection in the line $x = -1$ or for shape **B** reflected in $y = -1$)
						Total 4 marks

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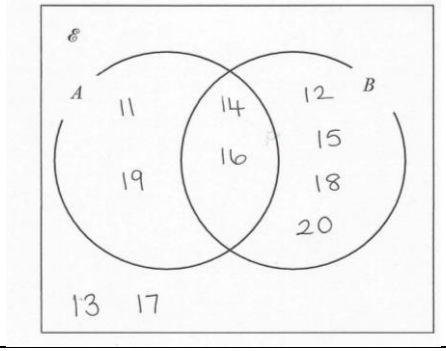
15			3	B3 For all 4 parts of Venn diagram correct (B2 for 2 or 3 parts correct, B1 for 1 part correct)
				Total 3 marks

16	1.63(17…) or 1.43(17…) or $\frac{5258}{27\,425}$ or 0.19, 0.191, 0.192, 0.1917		2	M1 A start to the calculation or an answer given as a fraction or a prematurely rounded answer
	Correct answer scores full marks (unless from obvious incorrect working)	0.19172(28806)		A1 at least 5 dp
				Total 2 marks

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17	for $k = 18$ or $(8 + j) \div 2 = 10$ or $(j =) \ 10 \times 2 - 8$ or $8 + j = 2 \times 10$ or $j = 12$ or $k - h = 13$ or "18" $- h = 13$ or $h = 5$		3	M1	For a correct value for *h*, *j* or *k* or for a correct statement for one of these
	for two of the above			M1	for 2 correct values from *h*, *j* or *k* or for 2 correct statements for them
	Correct answer scores full marks (unless from obvious incorrect working)	$h = 5$ $j = 12$ $k = 18$		A1	All correct
					Total 3 marks

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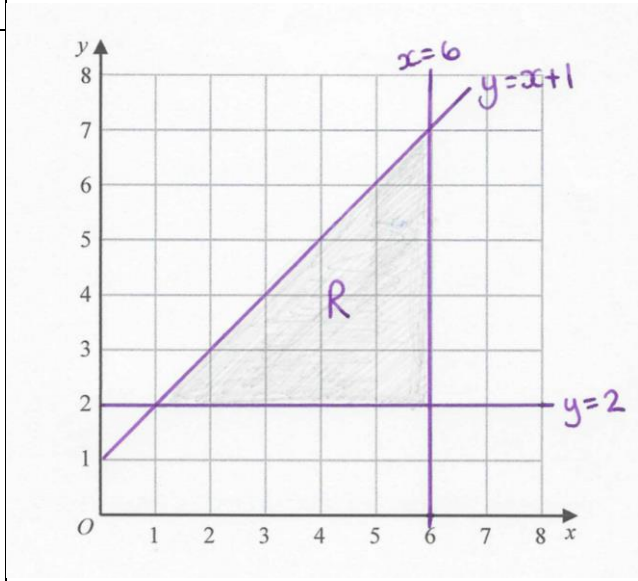
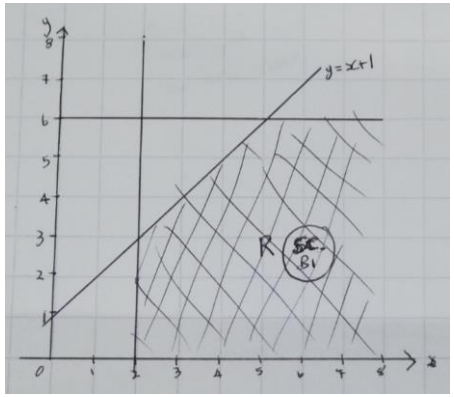
18	(a)(i)		$y = 2$ drawn	3	B1	Lines (can be solid, dotted or dashed) must be at least 2 cm long and need not be labelled
	(ii)		$x = 6$ drawn		B1	
	(iii)		$y = x + 1$ drawn		B1	
	(b)			1	B1ft	Correct region indicated ft dep on at least B2 scored and a vertical line, a horizontal line and a diagonal line with a positive gradient SCB1 for $y = x + 1$, $y = 6$ and $x = 2$ and area shaded as shown below 
						Total 4 marks

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19	For 9 hrs 36 mins = 9.6 (hrs) or $9\frac{36}{60}$ (hrs) or $9\frac{3}{5}$ (hrs) oe or 576 (mins)		3	M1	For a correct conversion of time into hours or into minutes	Award M2 for $820\times 9+\frac{820}{60}\times 36$ $\left(=7380+492\right)$ **or** $\frac{34560}{60\times 60}\times 820$ oe
	eg 820 × "9.6" or $820\times\frac{576}{60}$ or $576\times\frac{820}{60}$ or $576\times\frac{41}{3}$ (allow 13.7 for $\frac{41}{3}$) oe			M1	For use of distance = speed × time in hours (eg allow use of 9.36 for this mark)	
	Correct answer scores full marks (unless from obvious incorrect working)	7872		A1	SCB1 for 7675.2 if no other marks awarded	
						Total 3 marks

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20	$\frac{18}{7}, \frac{28}{9}$		3	M1	for correct improper fractions
	$\frac{\cancel{18}^{2}}{7^{1}} \times \frac{28^{4}}{\cancel{9}^{1}}$ or $\frac{18}{7} \times \frac{28}{9} = \frac{504}{63}$ oe eg $\frac{\cancel{18}^{2}}{7} \times \frac{28}{\cancel{9}^{1}} = \frac{56}{7}$ or $\left(\frac{18}{7} \times \frac{28}{9} =\right) \frac{162}{63} \times \frac{196}{63} = \frac{31752}{3969}$			M1dep	for cancelling fractions fully or cancelling fractions partially and clear intention to multiply (allow arithmetic error in multiplication) or not cancelling and clear intention to multiply (allow arithmetic error in multiplication)
	eg $\frac{\cancel{18}^{2}}{7^{1}} \times \frac{\cancel{28}^{4}}{\cancel{9}^{1}} = 8$ or $\frac{\cancel{18}^{2}}{7^{1}} \times \frac{\cancel{28}^{4}}{\cancel{9}^{1}} = 2 \times 4 = 8$ eg $\frac{18}{7} \times \frac{28}{9} = \frac{504}{63} = 8$ oe or eg $\left(\frac{18}{7} \times \frac{28}{9} =\right) \frac{162}{63} \times \frac{196}{63} = \frac{31752}{3969} \left(= \frac{8}{1}\right) = 8$ *working required*	Shown		A1	Dep on M2 for a correct answer from fully correct working Candidates may show $8 = \frac{8}{1}$ (maybe under the given 8) and then they need only show the given fraction comes to $\frac{8}{1}$
					Total 3 marks

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21	$\sin 34 = \frac{x}{6.5}$ or $\frac{x}{\sin 34} = \frac{6.5}{\sin 90}$ $6.5^2 - (6.5 \times \cos 34)^2$ or $\cos 56 = \frac{x}{6.5}$ oe		3	M1 a correct trig statement for x
	$(x =)\ 6.5 \times \sin 34$ or $x = \frac{6.5 \times \sin 34}{\sin 90}$ or $(x =) \sqrt{6.5^2 - (6.5 \times \cos 34)^2}$ or $(x =) 6.5 \times \cos 56$ oe			M1 a fully correct method to find x
	Correct answer scores full marks (unless from obvious incorrect working)	3.6		A1 awrt 3.6
				Total 3 marks

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22	For one of $w \div 1000$ or $w \div 10^3$ or $w \times 10^{-3}$ or $0.001w$ oe or $(w \times 60 \times 60)$ oe or $w \times 3600$ or $w \div \frac{1}{3600}$ oe		3	M1 award this mark for $\frac{3600}{1000}$ or $\frac{18}{5}$ or 3.6 oe (without a link to w)
	$\frac{w \times 60 \times 60}{1000}$ oe eg $w \times \frac{3600}{1000}$			M1 For a fully correct method including w
	Correct answer scores full marks (unless from obvious incorrect working)	$3.6w$		A1 or $\frac{18}{5}w$ or $3\frac{3}{5}w$ allow $3.6 \times w$
				Total 3 marks

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23	eg 13 × 21 (=273) **or** 21 × h (= 21h) **or** 0.5(15 + 21) × y oe **or** 15(h – 13) **or** 2 ×½(3(h – 13)) **or** ½(13 + h) ×3 (= 19.5 + 1.5h) **or** 15 × h (= 15h)		4	M1	A correct calculation for an area linked to the shape. (h – 13) might be written as x or y etc: this is acceptable (even allow h) [allow without brackets for this mark only]
	eg 390 – "273" (= 117) **or** 13×21 **and** $0.5(15+21)(h-13)$ oe **or** 13×21 **and** $0.5(15+21)y$ oe **or** 21h **and** 2 ×½(3(h – 13)) oe **or** 13 × 21 **and** 15(h – 13) **and** 2 ×½(3(h – 13)) oe **or** 2 × ½(13 + h) ×3 **and** 15 × h			M1	For considering the area of all parts of the shape (parts need not be added or subtracted for the whole shape) (where y = height of $BCDE$) (h – 13) might be written as x or y etc: this is acceptable (even allow h) [correct use of brackets]
	"117" ÷ (0.5 × (15 + 21))(= 6.5) or **or** $\frac{1}{2}(15+21)\times y="117"$ **or** 273 + 18(h – 13) = 390 **or** 15(h – 13) + 2 ×½(3(h – 13)) ="117" oe **or** 2 × ½(13 + h) ×3 + 15h = 390 **Typical equations here simplify to :** 18y = 117, 18h – 234 = 117, 18h + 39 = 390, 18h = 351			M1	A correct calculation to find height of trapezium or height of shape or a correct equation involving height of trapezium or height of shape or 6.5 (h – 13) might be written as x or y etc: this is acceptable (even allow h) [correct use of brackets]
	Correct answer scores full marks (unless from obvious incorrect working)	19.5		A1oe	eg $\frac{39}{2}$
					Total 4 marks

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24	600 ÷ (9 + 4 + 2) (= 40) or tulip: 0.45 × 600 (= 270) or crocus: $\frac{5}{8}\times 600$ $(=375)$	Tulips: 0.45 × 9 (= 4.05) or $0.45\times\frac{9}{15}\left(=\frac{27}{100}(=0.27)\right)$ oe		5	M1	A correct method to find one share (360 or 160 or 80 seen implies this method mark) or 45% of 600 or $\frac{5}{8}$ of 600 or the fraction of the share that is for tulips
	Daffodils: "40" × 2 (= 80) or $\frac{2}{15}\times 600(=80)$ (implies 1st M1)	Crocus: $\frac{5}{8}\times 4(=2.5)$ or $\frac{5}{8}\times\frac{4}{15}\left(=\frac{1}{6}(=0.16\dot{6})\right)$ oe			M1	A correct method to find number of daffodils or the fraction of the share that is for crocus
	Tulip: 0.45 × (9 × "40")(=162) or $0.45\times 600\times\frac{9}{15}$ $(=162)$ (implies 1st M1)	Total of parts 4.05 + 2.5 + 2 (= 8.55) or $\frac{27}{100}+\frac{1}{6}+\frac{2}{15}\left(=\frac{57}{100}\right)$ oe (implies 1st and 2nd M marks)			M1	A correct method to find number of yellow tulips or the total of the parts that are yellow
	Crocus: $\frac{5}{8}\times(4\times"40")$ (= 100) or $\frac{5}{8}\times 600\times\frac{4}{15}$ $(=100)$ (implies 1st M1)	$\frac{8.55}{9+4+2}\times 600$ oe or $\frac{57}{100}\times 600$ oe (implies all previous M marks)			M1	A correct method to find number of yellow crocuses or multiplying the total of the correct shares by 600
	Correct answer scores full marks (unless from obvious incorrect working)		342		A1	
						Total 5 marks

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25	4500 × 1.024 (= 4608) oe or 4500 × 0.024 (= 108)		3	M1	M2 for 4500×1.024^4 or 4500×1.024^5
	"4608" × 1.024 (= 4718.592) and "4718.592"× 1.024 (= 4831.838…) and "4831.838"× 1.024 (=4947.80…)			M1	
	Correct answer scores full marks (unless from obvious incorrect working)	4948		A1 4947 – 4948 if no other mark awarded, SCB1 for 4500 × 0.024 × 4 (= 432) 0.096 × 4500 (=432) or 4500 + 4500 × 0.024 × 4 (= 4932) 4500 × 1.096 (= 4932) 0.976 × 4500 (=4392) or 0.904 × 4500 (=4068) or 0.976^4 × 4500 (=4083…) or 4500×1.024^3 (= 4831.83...)	
					Total 3 marks

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26	$_6x + 4y = 1$ $\quad\quad$ $_30x + 20y = 5$ eg $6x + 10y = 16$ or $12x + 20y = 32$ oe $(6y = 15)$ $\quad\quad$ $(18x = -27)$ or eg $6x + 4\left(\frac{8-3x}{5}\right) = 1$ or $3\left(\frac{1-4y}{6}\right) + 5y = 8$		3	M1	A correct method to eliminate x or y – multiplying one or both equations so that one value can be eliminated **and** the correct operation to eliminate which can be shown by 2 out of 3 terms correct for subtraction or addition (allow one arithmetic error in multiplying) **or** for a correct substitution of one variable into the other equation. NB: the mark is for the method and not for the result of the method – although if the correct result is seen, this means the mark is awarded
				M1dep	A correct method to calculate the value of the other letter (dep on M1) eg substitution of found variable into an equation (equation does not need to be solved) or starting again with elimination or substitution
	working required	$x = -1.5$, $y = 2.5$		A1oe	dep on M1 Must be a vulgar fraction or mixed number or a decimal (eg do not allow $y = \frac{12.5}{5}$)
					Total 3 marks

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27 (i)	$(x \pm 2)(x \pm 11)$		2	M1	or $(x + a)(x + b)$ where $ab = -22$ **or** $a + b = 9$
	Correct answer scores full marks (unless from obvious incorrect working)	$(x - 2)(x + 11)$		A1	
(ii)		$2, -11$	1	B1ft	**Must** ft from their factors in (i)
					Total 3 marks

28	$4 \times 11\,800$ (= 47 200) or $3 \times 13\,207$ (= 39 621) or 86 821		3	M1	for one correct product or for the sum of the products
	$\frac{"47\,200" + "39\,621"}{7} \left(= \frac{86\,821}{7} \right)$			M1	for a fully correct method to find the mean for the 7 days
	Correct answer scores full marks (unless from obvious incorrect working)	12 403		A1	
					Total 3 marks

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