



Countdown to your final Maths exam ...

Crossover part 6 (2020)

Markscheme & Examiners Report

Examiner's Report

Q1. It was unusual to see errors in any parts of this basic algebra question. When collecting like terms, a few candidates, who were fine with $4m$ and $2m$, were unsure about what to do with the single m . When asked to multiply two terms, the occasional candidate added the numbers.

Q2. While many correct answers were seen, a significant number of students were unable to make any progress with this question.

Q3. The majority of candidates correctly gave c^7 as the answer to the first part, although c^{12} had some support.

About a quarter of candidates achieved some success on the second part. They used a variety of approaches, ranging from the formal construction and solution of equations to more informal inspection methods. The most frequent error was to ignore the y in the denominator. Thus, answers of 3 (from $n + 3 = 6$) and of 2 (from $n \times 3 = 6$) appeared more often than the correct answer.

Q4. In part (a), only a small number of students were not able to multiply two algebraic terms. Collecting like terms in part (b) was also well done, although the directed number aspect is still an issue for some. The most commonly seen error was simplifying $7k + k$ to give $7k^2$. In part (c) a large majority could solve the equation, with an algebraic method seen regularly, as was a simple numerical calculation. A few misinterpreted $5y$ as meaning $5 + y$ and worked accordingly to find a value for y that fitted their invented equation, scoring no marks.

Q5. In part (a) most candidates fully understood the method required to gain correct answers. By dividing 200 or 230 by 6 truncation errors often crept in and by subsequently multiplying by 15 these errors became significant and produced inaccurate final answers, (typically around 574.95 and 499.95 instead of 575 and 500). Some responses displayed long-winded algorithms of doubling the amounts (12 people), halving the amounts (3 people) and then adding.

In part (b) many recognised the need to add the weight of all the ingredients but were unsure what to do with the resulting 800 grams. Weaker candidates concentrated on doing some arithmetic on 160 grams (soft brown sugar), usually dividing by 6 (because of the 6 persons).

Q6. In part (a) the square root, rather than the cube root, of 64 (8) was frequently given as an incorrect answer. In part (b) 8^8 was a very common incorrect answer. Expressing 600 as a product of powers of its prime factors in part (c) gave many the opportunity to score 3 marks for a fully correct response or 2 marks for expressing it as a product of its prime factors, failing to recognise the significance of 'powers'. Other students were able to make a correct start in repeated factorisation for one mark before errors in the process became evident. The question clearly required working to be shown; there were students who presented a correct solution on the answer line but with no working; this gained them no marks.

Q7. While many candidates gained full marks in this question, some lost one mark for the wrong coefficient of d .

Q8. It was reasonably common to see candidates get parts (b) and (c) correct but part (a) wrong. 400 (from $750 - 350$) was a common incorrect answer for part (a). In part (c) some used the value of 150 (ml) for 1 person from part (b) rather than 125 (g) for 1 person.

Q9. (a) We saw a good number of fully correct responses and there were many students who were able to gain one mark for one correct term. It was evident that many students did not understand which term the negative sign was linked to.

(b) We saw many correct responses with common mistakes being to forget to multiply $2y$ by -7 or to think that $2y \times 3y$ is $5y^2$.

Q10. Many students were able to give correct answers to part (a), with only a minority writing, for example t^3 . For students who understand the concept of an equation part (b)(i) proved relatively straightforward. However, many students did not and wrote down answers which came from some combination of the 8, 3 and 9. Part (b)(ii) was a question where students had to demonstrate understanding and use of balancing when solving a linear equation. A correct solution found by either trial and error or without any algebraic working scored no marks. One possible convincing solution was to write $7y - 2y = 6 + 8$ followed by $5y = 14$ and then $y = 2.8$. Many students did do this or something very similar. Part (c) was more challenging than (a) and (b), but many students had been prepared well to write down all 4 terms, so that even if the signs were wrong they scored a mark.

Q11. Parts (a) and (b) were generally correct. In part (c), some got as far as $5 : 8$ but were then unsure how to proceed to the required form of $1 : n$. Others divided 5 by 8 to give a final incorrect answer of $1 : 0.625$

Q12. Part (a) was reasonably well done. In part (b) some candidates gave their final answer using the equals sign or an incorrect inequality.

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)		$5m$	1	B1
(b)		$35p$	1	B1
(c)		5	1	B1
(d)		15	1	B1

Q2.

Question	Working	Answer	Mark	Notes
	1 can of soup weighs $0.8 \div 4 = 0.2$ kg 4 jars of peppers weigh $4.1 - 3 \times 0.2$ kg = 3.5 kg 1 jar of peppers weigh $3.5 \div 5$	0.7	4	M1 for $0.8 \div 4$ or 0.2 or 0.6 M1 for $4.1 - 3 \times "0.2"$ ($=0.35$) M1 for $"3.5" \div 5$ A1
				Total 4 marks

Q3.

Question	Working	Answer	Mark	Notes
(a)		c^7	1	B1 cao
	$y^{3+n-1} = y^6$ oe or $y^{3+n} = y^7$ or $3 + n - 1 = 6$ oe or $y^n = \frac{y^7}{y^3}$ or $y^n = \frac{y^6}{y^2}$ or $y^n = y^4$		2	M1 SC if M0, award B1 for an answer of y^4
		4		A1 cao
				Total 3 marks

Q4.

Question	Working	Answer	Mark	Notes
(a)		$12ef$	1	B1
(b)		$3m + 8k$	2	B2 B1 for $3m$ or $(+) 8k$
(c)	$5y = 14 - 3$ or $5y = 11$ or $3 - 14 = -5y$ or $-11 = -5y$		2	M1
		$2\frac{1}{5}$		A1 for $2\frac{1}{5}$ or $\frac{11}{5}$ oe or 2.2

Q5.

Q	Working	Answer	Mark	Notes
(a)	$15 \div 6 (=2.5)$ or $6 \div 15 (=0.4)$ or $230 \div 6 (=38.33)$ or $200 \div 6 (=33.33)$ or $6 \div 230 (=0.026)$ or $6 \div 200 (=0.03)$ $230 \times "15/6"$ or $200 \times "15/6"$ oe	apples = 575 & raspberries = 500	3	M1 M1 dep (i.e "correct" calculation for apples OR raspberries) A1 both correct SC M1M1A0 if answers wrong way round with/without working
(b)	$120 + 230 + 200 + 160 + 90 (=800)$ $160 / "800"$	$1/5$	3	M1 M1 dep A1 cao SC B2 for 0.2, 20%, $2/10$ no working

Q6.

Question	Working	Answer	Mark	Notes
(a)		4	1	B1
(b)	8×1024		2	M1 For 8 (from 2^3) or 1024 or $2 \times 2 \times 2 \times 4 \times 4 \times 4 \times 4 \times 4$
		8192		A1 accept 2^{13}
(c)	$600 = 2 \times 300 = 2 \times 2 \times 150 = 2 \times 2 \times 2 \times 75 =$ $2 \times 2 \times 2 \times 3 \times 25 = 2 \times 2 \times 2 \times 3 \times 5 \times 5$		3	M1 For at least 2 correct steps in repeated factorisation (may be seen in a tree diagram)
				A1 for correct factors E.g. 2, 2, 2, 3, 5, 5 (condone inclusion of 1)
		$2^3 \times 3 \times 5^2$		A1 NB: Candidates showing no working score 0 marks.

Q7.

Question	Working	Answer	Mark	Notes
		$2c + d$	2	B2 B1 for $2c$ B1 for $+ d$ or $+ 1d$

Q8.

Question	Working	Answer	Mark	Notes
(a)	$750 : 350$ oe		2	M1 Also award for $7 : 15$, 15 to 7
		$15 : 7$		A1
(b)	$900 \times \frac{13}{6}$		2	M1 for $\frac{900}{6}$ or 150 or $\frac{13}{6} (=2.16\dots)$ oe or 900×13 or 11 700
		1950		A1 cao
(c)	$6 \times \frac{1250}{750}$ or $1250 \div \frac{750}{6}$		2	M1 for $\frac{1250}{750}$ oe ($=1.66\dots$) or $\frac{750}{1250}$ oe ($=0.6$) or $\frac{750}{6}$ oe ($=125$)
		10		A1 cao
				Total 6 marks

Q9.

Q	Working	Answer	Mark	Notes
(a)	$8e - 11e + 2f + 3f$	$-3e + 5f$	2	B2 B1 for $-3e$ or $5f$
(b)		$6y^2 \quad 14y$	2	M1 For $6y^2$ or $14y$ A1
				Total 4 marks

Q10.

Question Number	Working	Answer	Mark	Notes
(a) (i)		$3t$	1	B1 accept $t3$
(ii)		$5ab$	1	B1 any combination but do NOT accept multiplication signs
(b) (i)	$8x = 9 + 3$	1.5 oe	2	M1 or $9+3 \div 8$ with or without brackets A1
(ii)	$5y = 14$ or $7y - 2y = 14$ or $5y = 8 + 6$ or $5y - 14 = 0$		3	M2 for correct rearrangement with y terms on one side and numbers on the other AND correct collection of terms on at least one side or for correct collection of to 2 terms M1 for correct rearrangement with y terms on one side and numbers on the other eg $7y - 2y = 8 + 6$ or correct collection and simplification of either numbers or y terms eg. $5y - 6 = 8$ or $5y = a$ or $by = 14$ A1 2.8 oe dependent on at least one M1
(c)	$x^2 - 6x + 9x - 54$	$x^2 + 3x - 54$	2	M1 4 correct terms ignoring signs or for 3 correct terms out of 4 terms with signs A1
				Total 9 marks

Q11.

Question	Working	Answer	Mark	Notes
(a)	$(40 \div 16) \times 240$ oe			M1 for a fully correct method
		600	2	A1
(b)	$(600 \div 120) \times 16$ oe			M1 for a fully correct method
		80	2	A1
(c)	$240 \div 150$ or $150 : 240$ oe			M1
		1.6 oe	2	A1
				Total 6 marks

Q12.

Question	Working	Answer	Mark	Notes
(a)		y^5	1	B1 cao
(b)	$4x + 12 > 8$ or $x + 3 > 2$		2	M1
		$x > -1$		A1
				Total 3 marks