

COUNTDOWN TO YOUR FINAL MATHS EXAM ... PART 4

EXAMINERS REPORT & MARKSCHEME

Examiner's Report

Q1.

Most candidates tried to find 65% of 8420 (often unsuccessfully) and one fifth of 8420 (often successfully). Calculating 65% of 8420 by 'breakdown' methods of finding 10% and 5% often lead to inaccuracies and as working was not clearly shown such as $10\% = 8420 \div 10$ and $5\% = \text{their } 10\% \div 2$, many marks were lost. Those that wrote $65 \div 100 \times 8420$ tended to be more successful. Only a small percentage of candidates went down the route of adding 65% and 20%. Of those that employed this method most then gave an answer of 15% rather than continuing to find 15% of 8420.

Q2.

The majority of students were successful. Those who could not work out both 5% of 300 and $\frac{2}{5}$ of 300 were few in number. Some students, having found 5% of £300 and subtracted it from £300, worked out $\frac{2}{5}$ of the money left instead of $\frac{2}{5}$ of £300.

Q3.

Very few candidates failed to select the appropriate values from the given spreadsheet and it was rare for any candidate not to gain some credit on this question. The most common errors made were in the calculations of $\frac{1}{3}$ and 25% of a costing. Many gave answers, often incorrect, without fully showing their method to either find $\frac{1}{3}$ or 25% of a number. Many candidates opted for 33% or 0.3 instead of 33.3...and this method mark was more often given for correctly finding 25% and subtracting. However, the accuracy mark was then lost. Even when these calculations were carried out accurately, many failed to deduct their answers from their values of costs, showing little understanding of the term 'discount' or the word 'off'. Premature rounding of monetary values prevented many candidates from gaining full marks. For example $\frac{1}{3}$ of £150.25 was often rounded to £50. Some candidates failed to read the question properly and chose the wrong amount of adults or children. Calculators were often not used for finding a third or 25% and accuracy marks were lost as a result of this. It is pleasing to report that the great majority of candidates conclude their solution with an acceptable statement regarding the favoured ferry company.

Q4.

Performance on this question was very poor with 95% of candidates scoring no marks at all. In part (a) there was a common assumption that P(2) and P(3) were equal leading to evaluation of 0.3 for each. Where candidates did use 1 as the sum of the probabilities, they were unable to provide a correct algebraic expression.

Candidates had marginally more success with part (b) but the correct expression was very rarely seen and more often a numerical value calculated in part (a) was used.

Q5.

This question was attempted by most candidates but many failed to gain any marks or only gained M1 for equating 96 to $\frac{3}{5}$

The most common error was to equate 96 to $\frac{2}{5}$ which led to 38.4 which they rounded to 38 and added to 96 to get 134, these candidates usually gained M0M0A0 though a few also had 96 equated to $\frac{3}{5}$ in their working to gain M1.

Other candidates, who only gained M1, correctly calculated 32 or 64 but did not realise that they needed to multiply the 32 by 5 or add the 64 to 96. Candidates rarely used ratios to solve the problem and when they did often incorrectly used 5 for the female shares.

Q6.

There were very few errors in part (a). The most common either to simply sum the three given probabilities (= 0.74) and then fail to subtract from 1 or perform an arithmetic error, usually in addition, even though a calculator

was available.

In part (b), although well answered, a significant number of candidates failed to use the given probability of 0.15, choosing rather to use their answer to part (a). Common errors seen were, $300/4 \times 0.15$, $300/4$, $300/15$, 0.15×200 and $300/0.15$

Q7.

For part (a) most candidates were able to add the probabilities to obtain 0.76. Many understood that the probabilities should add to 1 and were able to subtract to get 0.24 but then this was commonly divided by 3 rather than 4. The divide by 3 resulted from the 3x in the table which suggests that centres need to be aware of the link to algebra rather than the old style tables which required finding the missing box. Those who did manage to divide by 4 often got an answer of 0.6 rather than 0.06. Some failed to note the decimal point and divided 24 by 4, without noting that this was then a percentage.

Few candidates gained full marks in part (b). Many scored one mark for one correct product, most thinking that the only possibilities were 3+5 and 4+4. Many did not consider 5+3 as well. Four pairs were often identified rather than three. Having made a choice of pairs, candidates frequently added the probabilities rather than multiplying. Common wrong answers seen were 0.46 and 0.42. A minority used a two-way table clearly showing the three ways of scoring 8 but generally assumed the probabilities in the table were all equally likely, ignoring the information in part a and thus producing an incorrect answer.

Q8.

Most candidates were able to get at least 1 mark in part (a) and many scored both. The principal error was that the sum of the probabilities on branches was not the unity it ought to have been.

Part (b) was well answered – many candidates knew that it was a multiply and had their calculators to get the correct answer. Some candidates added to get a probability greater than 1.

Part (c) was less successfully answered as often candidates only considered 2 of the 3 cases. The omitted case tended to be the one already found in (b), so candidates were generally interpreting the demand of 'at least one' as 'exactly one'. It was pleasing to see some candidates using the economical $1 - 0.4 \times 0.5$.

Q9.

There were many correct answers – with or without a full or partial probability tree – although some candidates were not able to complete their attempt at such a diagram. A very common answer to part (a) was 0.6 obtained from $0.2 + 0.4$.

Generally candidates who got part (a) correct also got part (b) correct. Oddly enough, this did not seem to happen the other way around. In part (b), in many cases candidates displayed the correct calculation of $0.4 \times 0.2 + 0.6 \times 0.8 = 0.56$, but got a completely wrong answer to part (a). For part (b), a few candidates worked out the 0.4×0.2 and the 0.6×0.8 but then multiplied the answers to the two calculations.

Q10.

Part (a) was done well. Many candidates were able to divide 0.9 in the ratio 1:2 (usually by inspection), but some

incorrectly gave 0.6 on the answer line. A very common error here was $\frac{1-0.1}{2}$ (=0.45).

Part (b) was not done well. Few candidates could work out the required probability by calculating $(0.1)^3$. A very common incorrect answer here was 3×0.1 . Some candidates, having reached the correct calculation $(0.1 \times 0.1 \times 0.1)$ were unable to evaluate this correctly. A common incorrect answer here was 0.01.

Part (c) was not done well. Only the best candidates opted for the direct approach and were able to deal with the probabilities 0.3 and 0.7 correctly to arrive at the correct calculation (usually by drawing a tree diagram). Many candidates attempted this question by dealing with all three probabilities 0.1, 0.3 and 0.6 and drawing a tree diagram with 27 outcomes. Few of those candidates attempting this approach were able to select all the correct outcomes for the required probability.

Q11.

Performance on this question was very disappointing with less than 20% drawing a fully correct plan and very few picking up a single mark for a rectangle with one correct dimension. There were a great many nets or 3-D representations of the cuboid offered instead and a high proportion of blank responses seen.

Q12.

This question was well answered. The majority of candidates were awarded both marks. A further few candidates scored one mark for a convincing attempt at the correct side elevation. This was given where errors consisted of lengthening or shortening some of the sides but where the shape had two vertical lines, two horizontal lines and one sloping line in the correct order. A minority of candidates attempted to sketch a three-dimensional representation of the prism. Examiners were unable to award these candidates any marks.

Q13.

Many candidates drew a net rather than a plan in part (a) and gained no marks. The fact that nets were so common suggests that candidates were not as familiar with the topic of plans and elevation as they should have been. When a rectangular plan was drawn, it was not uncommon for at least one dimension to be wrong.

Candidates were more successful in part (b) with many able to draw a correct sketch of the prism. Some candidates attempted to display more faces than could be seen from any one angle, thus distorting the sketch. Triangular prisms and pentagonal prisms were quite common among the responses awarded no marks.

Mark Scheme

Q1.

PAPER: 5MB3F_01				
Question	Working	Answer	Mark	Notes
	65% is 5473 $\frac{1}{5}$ is 1684	1263	4	M1 for a correct method to find 65% (= 5473) of the customers M1 for a correct method to find $\frac{1}{5}$ (= 1684) of the customers M1 (dep on M2) for a correct method to find the remaining number of customers A1 cao OR M1 for a correct method of adding 65% and $\frac{1}{5}$ when both correctly written as percentages (= 85%) or decimals (= 0.85) or fractions (= $\frac{85}{100}$ oe) M1 ft for a correct method to find the percentage or decimal or fraction of the customers (= 7157) M1 (dep on M2) for a correct method to find the remaining number of customers A1 cao
	85% is 7157 15% is 1263			

PAPER: 5MB3F_01				
Question	Working	Answer	Mark	Notes
(cont)				OR M1 for a correct method of adding 65% and $\frac{1}{5}$ when both correct percentages (= 85%) or decimals (= 0.85) or fractions (= $\frac{85}{100}$ oe) M1 ft for a correct method to find the remaining percentage (= 15%) or decimal (= 0.15) or fraction ($\frac{15}{100}$ oe) of the customers M1 (dep on M2) for a correct method to find the remaining number of customers A1 cao

Q2.

PAPER: 5MB1F_01				
Question	Working	Answer	Mark	Notes
		165	3	M1 for correct method to find 5% of 300 or $\frac{2}{5}$ of 300 M1 (dep) for 300 – “15” – “120” A1 cao OR M1 for 1 – 0.05 – 0.4 (= 0.55) M1 (dep) for “0.55” × 300 A1 cao

Q3.

Question	Working	Answer	Mark	Notes
*	$2 \times 39.50 + 3 \times 23.75 = 150.25$ $150.25 \div 3 = 50.08(33..)$ $150.25 - 50.08(33..) = 100.16(66..)$ $2 \times 40.25 + 3 \times 21.85 = 146.05$ $146.05 \div 4 = 36.51(25)$ $146.05 - 36.51(25) = 109.53(7)$ $2 \times (1 - \frac{1}{3}) \times 39.50$ $+ 3 \times (1 - \frac{1}{3}) \times 23.75$ $+ 2 \times 0.75 \times 40.25$ $+ 3 \times 0.75 \times 21.85$	Easy ferry	5	<p>M1 for 2×39.50 (=79) or 3×23.75 (= 71.25) or 2×40.25 (= 80.50) or 3×21.85 (= 65.55) M1 for $2 \times 39.50 + 3 \times 23.75$ (=150.25) and $2 \times 40.25 + 3 \times 21.85$ (=146.05)</p> <p>M1 for $(1 - \frac{1}{3}) \times '150.25'$ oe or $(100 - 25)\% \times '146.05'$ oe A1 for (£)100.16 to (£)100.17 and (£)109.53 to (£)109.54</p> <p>C1 for "Easy Ferry is cheaper" oe or ft from their 2 totals provided at least 2 Ms scored and it is clearly stated which total relates to which ferry company</p> <p>OR</p> <p>M1 for $(1 - \frac{1}{3}) \times 39.50$ oe (= 26.33) or $(1 - \frac{1}{3}) \times 23.75$ oe (=15.83) or $(100 - 25)\% \times 40.25$ oe (= 30.19) or $(100 - 25)\% \times 21.85$ oe (= 16.39) M1 for $2 \times "26.33"$ (= 52.66) or $3 \times "15.83"$ (= 47.50) or $2 \times "30.19"$ (= 60.38) or $3 \times "16.39"$ (= 49.17)</p> <p>M1 for $2 \times "26.33" + 3 \times "15.83"$ and $2 \times "30.19" + 3 \times "16.39"$ A1 for (£)100.15 to (£)100.16 and (£)109.55</p> <p>C1 for "Easy Ferry is cheaper" oe or ft from their 2 totals provided at least 2 Ms scored and it is clearly stated which total relates to which ferry company</p>

Q4.

Question	Working	Answer	Mark	Notes
(a)	$1 - 0.3 - 0.1 - x$	$0.6 - x$	2	<p>M1 for $0.3 + 0.1 + x + P(2) = 1$ oe A1 $0.6 - x$ or $\frac{6}{10} - x$ or $1 - (0.4 + x)$ Or $1 - 0.3 - 0.1 - x$</p>
(b)		$300x$	1	B1 for $300x, x \times 300$ oe

Q5.

Question	Working	Answer	Mark	Notes
	$P(F) = \frac{3}{5}$ $\frac{3}{5}$ students $= 96$ Total $= 96 \div 3 \times 5 = 32 \times 5$ or $F : M = 3 : 2 = 96 : x$ $M = 96 \div 3 \times 2 = 32 \times 2 = 64$ Total $= 96 + 64$	160	3	M1 for $P(F) = \frac{3}{5}$ or $96 \div 3$ or $\frac{3}{5}$ (students) = 96 oe or 32 seen M1 for $96 \div 3 \times 5$ or "32" $\times 5$ or "480" $\div 3$ A1 cao or M1 for $F : M = 3 : 2$ oe or $3 : 2 = 96 : ?$ oe or $96:64$ or 64 seen M1 for $96 \div 3 \times 2 + 96$ or "32" $\times 2 + 96$ or "192" $\div 3 + 96$ or "64" $+ 96$ A1 cao

Q6.

Question	Working	Answer	Mark	Notes
(a)	$1 - (0.15 + 0.32 + 0.27)$ $1 - (15 + 32 + 27)$ $1 - (\frac{15}{100} + \frac{32}{100} + \frac{27}{100})$	0.26 26% $\frac{26}{100}$ (oe)	2	M1 for $1 - "(0.15 + 0.32 + 0.27)"$ oe A1 for 0.26 or $\frac{26}{100}$ (oe) or 26% (must include the % sign) [Note: 0.26 seen in the table and contradicted by an incorrect answer on the answer line gets M1A0]
(b)	0.15×300	45	2	M1 for $0.15 \times 300 (= 45)$ oe A1 cao

Q7.

Question	Working	Answer	Mark	Notes
(a)	$1 - (0.3 + 0.21 + 0.16 + 0.09)$ $0.24 \div 4$	0.06	3	M1 for $1 - (0.3 + 0.21 + 0.16 + 0.09)$ or $1-0.76$ or 0.24 M1 dep for "0.24" $\div 4$ A1 cao
(b)	0.3×0.16 $+ 0.16 \times 0.3$ $+ 0.21 \times 0.21$	0.1401	3	M1 for one correct product or 3 correct pairs identified by scores or probabilities. Ignore 4+4 repeated with no other errors. M1 for all correct products with intention to add A1 for 0.1401

Q8.

Question	Working	Answer	Mark	Notes
(a)		0.8 0.6 0.2 0.4 0.5 0.5	2	B2 for all 6 correct probabilities (B1 for two correct probabilities)
(b)	0.6×0.8	0.48	2	M1 for '0.6' \times '0.8' ft probability tree diagram A1 cao
(c)	$1 - (0.4 \times 0.5)$ $1 - 0.2$ OR $0.6 \times 0.8 + 0.6 \times 0.2 + 0.4 \times 0.5$	0.8	3	M2 for $1 - '0.4' \times '0.5'$ ft probability tree diagram A1 cao OR M2 for '0.6' \times '0.8' + '0.6' \times '0.2' + '0.4' \times '0.5' (M1 for any two of '0.6' \times '0.8', '0.6' \times '0.2', '0.4' \times '0.5' added) A1 cao

Q9.

	Working	Answer	Mark	Notes
(a)	Tree diagram Or $1 - 0.6 = 0.4$ $1 - 0.8 = 0.2$ 0.4×0.2	0.08	3	B1 for 0.4 or 0.2 seen oe M1 Indication of correct branch formed on tree diagram (or otherwise) leading to 0.4×0.2 or " 0.4 " \times " 0.2 " A1 0.08 oe
(b)	$0.4 \times 0.2 + 0.6 \times 0.8$	0.56	3	M1 0.6×0.8 or " 0.4 " \times " 0.2 " M1 $0.6 \times 0.8 + 0.4 \times 0.2$ or " 0.08 " + " 0.48 " A1 0.56 oe

Q10.

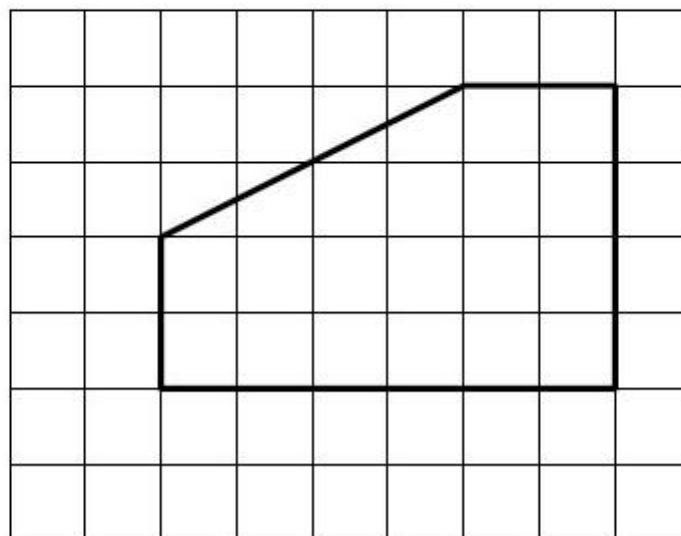
Question	Working	Answer	Mark	Notes
(a)	$1 - 0.1$ $0.9 \div 3$	0.3	2	M1 for $(1 - 0.1) \div 3$ or $0.1 + 0.3 + 0.6 (=1)$ or $0.6 \div 2$ A1 for 0.3 oe
(b)	$0.1 \times 0.1 \times 0.1$	0.001	2	M1 for $0.1 \times 0.1 \times 0.1$ oe A1 for 0.001 oe
(c)	$1 - (0.7 \times 0.7 \times 0.7)$ OR $3 \times 0.3 \times 0.3 \times 0.7$ $+ 3 \times 0.3 \times 0.7 \times 0.7$ $+ 0.3 \times 0.3 \times 0.3$ OR $3 \times 0.3 \times 0.3 \times (0.1 + 0.6)$ $+ 3 \times 0.3 \times (0.1 + 0.6) \times (0.1 + 0.6) + 0.3 \times 0.3 \times 0.3$ OR $0.3 \times 0.3 \times 0.3 + 3 \times 0.3 \times 0.3 \times 0.6 + 3 \times 0.3 \times 0.3 \times 0.1 + 3 \times 0.3 \times 0.6 \times 0.6 + 3 \times 0.3 \times 0.1 \times 0.1 + 6 \times 0.3 \times 0.6 \times 0.1$	0.657	3	M1 for $0.7 \times 0.7 \times 0.7$ or ft $(1 - 'a') \times (1 - 'a') \times (1 - 'a')$ M1 for $1 - 0.7 \times 0.7 \times 0.7$ or ft $1 - (1 - 'a') \times (1 - 'a') \times (1 - 'a')$ oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for $0.3 \times 0.3 \times 0.7 (=0.063)$ or $0.3 \times 0.7 \times 0.7 (=0.147)$ or $0.3 \times 0.3 \times 0.3 (=0.027)$ oe M1 for $3 \times 0.3 \times 0.3 \times 0.7 + 3 \times 0.3 \times 0.7 \times 0.7 + 0.3 \times 0.3 \times 0.3$ oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for $0.6 \times 0.6 \times 0.6 (=0.216)$ or $0.1 \times 0.6 \times 0.6 (=0.036)$ or $0.1 \times 0.1 \times 0.6 (=0.006)$ or $0.1 \times 0.1 \times 0.1 (=0.001)$ oe M1 for $1 - (0.6 \times 0.6 \times 0.6 + 3 \times 0.1 \times 0.6 \times 0.6 + 3 \times 0.1 \times 0.1 \times 0.6 + 0.1 \times 0.1 \times 0.1)$ oe A1 for 0.657 oe (SC B1 for 0.784 oe) OR M1 for $0.3 \times 0.3 \times 0.3$ or $0.3 \times 0.3 \times 0.6$ or $0.3 \times 0.3 \times 0.1$ or $0.3 \times 0.6 \times 0.6$ or $0.3 \times 0.1 \times 0.1$ or $0.3 \times 0.6 \times 0.1$ oe M1 for $0.3 \times 0.3 \times 0.3 + 3 \times 0.3 \times 0.3 \times 0.6 + 3 \times 0.3 \times 0.3 \times 0.1 + 3 \times 0.3 \times 0.6 \times 0.6 + 3 \times 0.3 \times 0.1 \times 0.1 + 6 \times 0.3 \times 0.6 \times 0.1$ oe A1 for 0.657 oe (SC B1 for 0.784 oe)

Q11.

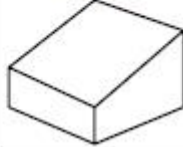
Paper: 5MB3F 01				
Question	Working	Answer	Mark	Notes
		3cm×6cm rectangle drawn	2	B2 cao (B1 for a rectangle with one correct side)

Q12.

	Working	Answer	Mark	Notes
		Correct elevation	2	M1 for a side elevation which shows 2 vertical, 2 horizontal and 1 sloping line in the correct order. A1 fully correct



Q13.

Question	Working	Answer	Mark	Notes
(a)		6 by 4 rectangle drawn	2	B2 for a 6 by 4 rectangle drawn (B1 for a rectangle drawn with one correct dimension) M1 for an attempt at a 3-D sketch with a trapezoidal face A1 for a correct 3-D sketch
(b)		3-D sketch 	2	