JustMaths

BUMPER "BETWEEN PAPERS" PRACTICE PAPER

SET 3 (OF 3)

HIGHER TIER (SUMMER 2017)

EXAMINERS REPORTS & MARKSCHEME

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!
YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME UP ON PAPERS 2 OR 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTISE, PRACTISE, PRACTISE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDEXCEL NEW 9-1 GCSE MATHS PAPER 1 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!

MEL & SEAGER

EXAMINERS COMMENTS

Q1. Many students could write the mixed numbers as improper fractions but then errors were made either in the multiplications or they omitted to change the improper fractions back to a mixed number.

Q2. Many candidates found the required angle to be 128°, some by incorrect methods and many more with insufficient reasoning. Common errors included taking *AOCB* as cyclic quadrilateral, saying that angle *ADC* was 116°, and also taking angles *BAD* and *BCD* to be right-angles. Errors in the reasons given included, omitting the word 'cyclic' from the description of *ABCD* and referring to the circumference of the circle as 'edge' or "perimeter". Many candidates gave "angles in a circle = 360" as a reason.

Q3. Candidates who were able to recognise that the given recurring decimal was 0.28181… rather than 0.281281… gained a generous first method mark. In order to gain the second method mark a full correct method had to be seen. Unfortunately, many attempted the subtraction of 281.8181… and 0.28181… which is an incorrect method. Some got as far as $^{27.9}/_{99}$ or $^{279}/_{99}$ but were then unable to finish their solution correctly to arrive at the correct answer of $^{31}/_{110}$. There were many incorrect guesses of $^{281}/_{10000}$ and $^{281}/_{999}$ seen.

Q4. Only a small proportion of students scored full marks here. Many students multiplied each of the equations through by a constant to ensure that either the coefficients of *x* or the coefficients of *y* were such that terms in that variable could be eliminated by either subtraction or addition of the two equations. Unfortunately, students did not indicate whether they intended to add or subtract the equations and accompanying errors often meant that it was not possible to give any marks to reward a correct method. It seemed that most students did not really understand what to do at this stage. Some students did manage to retrieve the situation to some extent by showing a correct substitution of one value as a method to find the value of the other.

Q5. There was much disorganised work in the few attempts seen. It was not uncommon to find the left hand side of the equation resolved into a single statement without resolving the denominator on the right hand side.

Q6. Many correct and accurate frequency polygons were seen. There were, however, many students who only scored one mark, generally for plotting at the end values of the intervals and joining the points. However many lost a mark for the correct plots at the mid-intervals without joining the points or drawing the correct frequency polygon but also joining the first and last points. Others had little idea what to do which was demonstrated by drawing bar charts or line graphs or by drawing a polygon shape on the grid.

Q7. There were a high proportion of fully correct answers. Those that didn't score full marks often used 68 and 92 independently, rather than adding to make 160. Another common mistake was simply to divide 30 by 6. A number of candidates started by dividing 160 by 30, those who realised they needed to divide the result by 33 were then able to continue to a fully correct answer.

Q8. This question was attempted by almost all candidates with most scoring full marks and those that did not usually gained M1 for one correct angle. Candidates rarely forgot to label the pie chart and in most cases labelled the angles as well as the require type of cat food. Candidates often did not show their working for the angles which, especially in the cases where candidates did not have a protractor could have earned them M1. Weaker candidates failed to use a ruler which sometimes led to angles outside the tolerance.

Q9. Most commonly the issue of bounds was ignored and the initial values were used in calculations, attracting no marks. A few used bounds given to the wrong level of accuracy. For some the only mark was for successful conversion into km/hour, but only where this was

clearly shown.

Q10. A correct cumulative frequency table was seen in most cases in part (a).
Points were usually correctly plotted in part (b), although sometimes these were at the midpoints of the groups from either the frequency or cumulative frequency tables.
This was usually followed by a correct reading of the median from their cf graph in part (c), although many candidates used 22 or 23 as the value on the cf axis. A significant number of candidates drew a 'line of best fit' through there correctly plotted points. This was not followed through in part (c) for their estimated median.

Q11 In part (a), there were a number of ways to gain the first mark in this part and many were able to gain at least one mark. Most were for at least one correct value in the table. Although a few managed to demonstrate that frequency = frequency density x column width, or a correct frequency density scale was seen. It was rare to see a correct area identified. The most commonly seen errors were 90 for the first frequency.

Part (b) was answered consistently well but common errors were drawing the first bar at 3cm and the second bar at either 4.8cm or 1.2cm for those that did not find the correct scale, or forgot to change the class width accordingly.

Part (c) proved to be beyond the capabilities of all but the very able. Although many candidates were able to find the interval in which the median lay, very few were able to progress beyond this point and either left their answer as a range or else gave the middle value of the group. A number of candidates attempted to calculate an estimate for the mean.

Q12. Part (a) required the candidates to draw an accurate box plot from the given data. There were very few non attempts and nearly all candidates, managed to score at least a mark for two correct values drawn with a box or whiskers. The majority managed to have the maximum and minimum values in the correct places, although the UQ and LQ values proved challenging to many.

In part (b), many candidates stated values without comparative statements thus losing marks. Those that used the word mean instead of median also lost that mark although 'average' was acceptable. Quite a few commented on the oldest and youngest members of women/men without any mention of range. Others stated that there were 'more older men than women' attending the tennis club, losing the mark as there is nothing to suggest the quantities of men at the club

Q13. The most common error in this question was to omit one or more of the descriptive elements, usually the centre of enlargement. Often the centre was quoted incorrectly; sometimes it was given as a vector. If the vector contained other than zeros, this was considered an element of a translation and thus a combination of transformations, gaining no marks.

Q14. This was a challenging question that was attempted by most candidates but poorly done by many. Those who drew guide lines from the correct centre often got full marks. Many of the incorrect responses were due to candidates using the wrong scale factor (often ½) or using the wrong centre of enlargement.

Q15. This was the first question on the paper where a significant minority chose not to attempt the question. It was disappointing to find so many who could not divide up the cross-section face correctly or merely multiplied 15×2×10. Too many worked with surface area rather than volume. There was some credit given for working with rates, where this was shown unambiguously in working.

In part (b) there were many correct answers, with B given as the most common incorrect

answer.

Q16. The first part of the question involved abstracting some information from the given travel graph and then using it to calculate the speed. Most students saw that the distance was 9 (km) but then wrote that down on the answer line. A sizeable number used the 9 (km) and the 10 (minutes) to work out a correct value of the speed as 0.9 (km/minute) but did not go on to convert this to km/hour as they thought they had found the answer. A few used the 9 and the 10 to find 10 ÷ 9 = 1.1. Some did have a better understanding that speed can be thought of as how far you go in a unit time so were able to scale up from 9 km in 10 minutes to 6 × 9 = 54 km in one hour. The second part of the question was not well answered as most students did not appreciate the implication of the 21 km. Most students were able to draw the 15 minutes at the rest part of the journey but then went astray on the sloping part. Often they joined (45, 21) to (70, 0). It is tempting to think that some of these students thought the time of return was the same as the time of approach without the stop. Another common error was to join to (80, 0). A few students had the last part of the journey still pointing upwards on the grid, so moving away from home.

Q17. In part (a) of this question approximately 10% of candidates could express $5\sqrt{27}$ as $15\sqrt{3}$, with a further 10% of candidates making some progress in breaking down to $\sqrt{9\times3}$, $\sqrt{9}\,\sqrt{3}$

In part (b) about one quarter of candidates knew that multiplying both the numerator and the denominator by $\sqrt{3}$ (or a multiple of $\sqrt{3}$) was the key to rationalising the denominator and most of these candidates were successful in expressing $\frac{21}{\sqrt{27}}$ as $7\sqrt{3}$ or an acceptable equivalent (e.g.). A common error seen was multiplication of only the denominator by . Other candidates progressed as far as = , only to conclude their argument with "5 + $\frac{21\sqrt{3}}{3}$ = $8\sqrt{3}$ ".

Q18. The vast majority of students gained full marks on this question. The two most common errors seen were to use simple interest or a multiplier of 1.25 instead of 1.025. Students should be reminded of the difference between simple and compound interest.

Q19. This was well answered. The most common method of solution was using a trial and improvement approach.

Q20. Most students were able to score at least one mark and many were able to score full marks. Those who split the diagram and wrote the dimensions on their rectangles scored well. A common error when splitting into two small rectangles and one large was in assuming that 6 and 10 were the dimensions of the larger rectangle. The calculation of the total area did prove challenging for some; the most common wrong answer was 70, obtained from 60 + 5 + 5 or 40 + 15 + 15. However, those who made this mistake often went on to achieve 3 out of 5 marks. Clear stages of working are what is needed to approach a problem like this. The presentation of solutions seems to have improved compared with previous years.

Q21. Part (a) was a multistep question which caught many candidates out. Although the information given was not difficult to organise, many candidates overlooked the fact that 2400 had to be reduced by 15%. Of those that did spot this a great majority could get the correct 360 and most of these went on to derive the 2040 as the dry weight of constituents. The ratio part of the problem was dealt with very well, whether it was 2400 or 2040, although a few candidates shared out the 360.

Part (b) required some insight and thought on how to go about answering the question. As this was a starred (QWC, Quality of Written Communication) question candidates were expected to make their calculations and resulting conclusion really clear. The most common successful method was to multiply the weight of cement found in part (a) by 30 and compare the answer with 6.5 tonnes. This comparison could only be legitimately made if the two weights were in the same units. Many candidates could not convert tonnes to kilograms correctly, often using a conversion factor of 10000. The other efficient method seen was to

convert the 6.5 tonnes of cement to kilograms, to then divide by 30 and compare with the answer (255) in part (a). To get full marks candidates had to have a correct method, be able to convert between kg and tonnes and come to a conclusion based on their calculations.

Q22. This question was a good discriminator. Students often did not take into account all the necessary conditions in order to answer this question.

Most students realized that multiples of 24 and 36 were key to answering the question and they usually scored the 2 marks for listing multiples of each number. However, some students lost accuracy in their lists or stopped once their lists had reached 250 instead of finding the lowest common multiple higher than 250.

Some students ignored the requirement to have enough book marks and dust covers for 250 books and found the first common multiple of 24 and 36, i.e. 72. Attempts by a trial and improvement method rarely ended in success. Under a half of all students scored full marks for their answers.

Q23. Again there were quite a number of nil attempts. However, most students identified that they needed to use Pythagoras as a first step, and AC was usually found correctly. It was rare to find students proceeding further in a logical way, since many incorrectly assumed that CBD or ABD was 45°. Any attempt at using trigonometry was usually based on an incorrect side or angle. No student used a similar triangle approach.

Q24. About two thirds of students were able to score some marks on this question. Of those who did the majority normally scored one mark for finding either *ABD* or *DBC*. A small proportion were then able to finish the problem to find *y*. However, almost no students gained any communication marks for the reasons they gave.

Q25. There were a significant number of students that did not attempt this question. However, many students did manage to gain a mark for calculating the exterior or interior angle of one of the polygons. It seemed like most students focussed on the pentagon rather than the octagon. There was often confusion between interior and exterior angles, which was evident from their diagrams. Where such contradiction was evident, method marks were lost. A common error was to consider the angles at the point Q rather than the isosceles triangle. There were many arithmetic errors seen, especially in division.

Q26. The majority of students were able to show that 40o was the required angle, although few were able to give fully correct reasons to support their working. Corresponding and alternate angles were often confused and reasons were often incomplete. It was common for the reasons to be ambiguous and not linked to the relevant working. Centres should make sure that their students understand what is required in this respect; mark schemes illustrate this very clearly. Angle labelling was also confused and misleading, often contradicting working. The use of 'F' and 'Z' angles was common. Centres should be aware that this is unacceptable at this level.

Q27. Very few students offered a convincing, fully correct solution to this question. Many demonstrated confusion between interior and exterior angles; 72o was often seen as an interior angle in the diagram. Even those giving the interior angle as 108o, often then failed to complete the solution correctly; many times angle BCD was shown as 108o and angle ACF as 90o followed by working just showing 108 – 90 or 90 – 72. Even though this gave the correct numerical answer, it was clear that it was the result of an incorrect method. Some students, even though they found an interior angle, thought that angle ABC was 90 or assumed that triangle ABC was equilateral. It was also fairly common to see AC as a bisector of angle BCA.

Q28. This question was done well. The vast majority of candidates were able to simplify the

given calculations and give their answers in a suitable form. Common incorrect answer were 5^{24} and $7^{2.5}$.

Q29. This question was a good discriminator. Many candidates labelled *AB* correctly and were awarded 1 mark. However, a common mistake was to think *DC* was 4 times longer than *AB* instead of 4cm longer, with 8*x* or *x* + 4 often seen on the diagram. Another common, though lesser seen problem appeared to be pupils becoming confused between the act of doubling a side and squaring it, leading to *AB* being labelled as x^2. Those taking the algebraic route usually attempted to add the 4 sides together and could simplify their expression. It was disappointing to see that so many candidates could not put together an algebraic argument and resorted to Trial and Improvement, usually stopping at an *x* value of 5.665. It must also be noted that many candidates used decimals and not fractions, but did not appreciate the difference between terminating and recurring decimals. Candidates need to understand that a recurring number is a perfectly acceptable answer and best left in fraction form $^{34}/_{6}$, or $^{17}/_{3}$ or $5\ ^{2}/_{3}$. Rounding or truncating an answer does not always gain the accuracy mark.

Q30 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.

Q31. Completely correct answers were rare. Most students were able to make an attempt at adding together the three algebraic terms, but many failed to progress to considering them as a mean, and introduce a division by 3. Of the few that did, there were too many occasions where the answer was given ambiguously (eg 4*x*+5÷3).

Q32 This question elicited a wide variety of responses. Many were unable to correctly identify all three terms that needed adding or else they tried to substitute numbers. Of those that managed to add *x*, *x* + 3 and 2*x* and gain one mark the second mark was lost by incorrect simplification, forgetting to divide by 3 or most commonly failing to realise the importance of brackets, with 4*x* + 3/3 and similar expressions being disappointingly common. Even though the question asked for an expression many candidates felt the need to express their answer in the form of a formula, providing the letter they chose was not *x* they were not penalised.

Q33. This question was well attempted but only the most able candidates gained full marks. Many candidates scored M1 for 5*x* or 7*y* though these expressions were often found in a jumble of algebraic expressions. Common incorrect responses included just 5*x*+7*y*, $\frac{(x+y)}{12}$ and $\frac{5x+7y}{2}$

Weaker candidates used $^{1}/_{5}$ and $^{1}/_{7}$ with no letters, described a process, made up numbers to use or wrote 12*xy*.

Q34. Many candidates were unable to make any meaningful progress because they failed to spot that the triangle was isosceles and consequently this question was answered very poorly. Candidates who did recognise that *AB* = *AC* usually wrote the equation 3*x* − 5 = 19 − *x*.

Isolating the x terms and the non-x terms in this equation proved a challenge for many with $2x = 14$ being quite a common error. Those who solved the equation correctly almost always went on to work out the perimeter as 38 cm. There were a number of trial and error attempts to find the value of x. The majority of candidates worked out the perimeter as an algebraic expression which was usually simplified to $4x + 14$. This was often turned into the equation $4x = 14$ (or $4x = -14$) and solved to give $x = 3.5$ (or $x = -3.5$). Many candidates scored just one mark for this question for substituting their value of x into either $4x + 14$ or into the three expressions and adding to find the perimeter.

Q35. The usual mistakes were made in using the given quadratic formula to solve this equation. The most common error was in substituting 2 instead of –2 for c. Many students failed to place the dividing line correctly and there were a number whose denominator was incorrect. Some students attempted to solve the equation by trial and improvement methods, often finding one correct root (0.29) but rarely the second. This method gained no credit unless both correct roots were found.

Q36. For part (a) most students scored marks. The correct construction method was the most successful. Some students lost marks where it was clear the compass settings were changed or adjusted mid construction. Compasses should be well maintained. The most common error was to draw arcs from the ends of the given lines.

In part (b) marks were obtained by the majority of those who attempted this part. It was disappointing that many constructed a perpendicular bisector of QR which did not pass through the point P.

Students need to leave full construction arcs in their final solution; these were sometimes difficult to assess as they were partially erased.

Q37. Students who brought a pair of compasses and used it within this question were usually at least partially successful. A surprising number drew intersecting arcs but did not join them with a straight line, possibly because they had half remembered the method or more prosaically did not have a ruler. Some students used arcs which were centred on each end of the line and they found that the intersections took place an uncomfortable long way up the page. Many used just one set of arcs, possibly thinking of the equilateral triangle construction and many drew arcs which just touched at the midpoint of the given line.

Q38. This non-standard locus question caught many students unawares. About half of the students shaded the intersection of the two circles rather than more that 10km from M and less than 6 km for N. About a half of the students gave a fully correct solution.

Q39. This was another question that usually gained full marks with arcs accurately drawn and shading correct. Only those who did not understand that an arc was required failed to score any marks. A few candidates shaded inside the arc and it was evident that a few did not use a compass.

MARK SCHEME

Q1.

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
			$14\frac{2}{3}$	3	M1 for method to write fractions as improper fractions with one correct M1 (dep on M1) for multiplying numerators and denominators A1 cao SC: B2 for $\frac{220}{15}$ oe

Q2.

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
*		128°	4	M1 for 180 – 116 (= 64), when clearly attempting to find angle *ADC* M1 (indep) for their angle *ADC* × 2 C2 (dep on M2) for x = 128(°) and fully correct reasons supported by method: eg. "opposite angles of a cyclic quadrilateral add up to 180°" and "the angle at the centre of a circle is twice the angle at the circumference" [C1 (dep on the relevant M1) for one correct reason] OR M1 for 116 × 2 (= 232), when clearly attempting to find reflex angle *AOC* M1 (dep) for 360 – '232' C2 (dep on M2) for x = 128(°) and fully correct reasons: eg. "the angle at the centre of a circle is twice the angle at the circumference" and "angles at a point add up to 360°" [C1 (dep on the relevant M1) for one correct reason] [SC: B2 for 128 seen identified as angle x, if M0 scored]

Q3

Question		Working	Answer	Mark	Notes
		eg. x = 0.28181… 100x = 28.181… 99x = 27.9	$^{31}/_{110}$	3	M1 for 0.28181(…) **or** 0.2 + 0.08181(…) **or** evidence of correct recurring decimal eg. 281.81(…) M1 for two correct recurring decimals that, when subtracted, would result in a terminating decimal, and attempting the subtraction eg. 100x = 28.1818…, x = 0.28181… and subtracting eg. 1000x = 281.8181…, 10x = 2.8181… and subtracting **OR** $^{27.9}/_{99}$ or $^{279}/_{990}$ oe A1 cao

Q4

PAPER: 5MB3H_01				
Question	Working	Answer	Mark	Notes
		$x = 0.4, y = -2$	4	M1 for a correct method leading to either x or y (condone one error) A1 for $x = 0.4$ or $y = -2$ M1 for a correct substitution into one of the equation or a correct method leading to the second value A1 cao

Q5.

5MB3H_01 November 2015				
Question	Working	Answer	Mark	Notes
		$\frac{4}{7}$	4	M1 for multiplication of all terms by a multiple of 6 eg $3(x+1) + 2(2x-1) = 5$ M1 for $3\times x+3\times 1$ $(=3x+3) + 2\times 2x - 2\times 1$ $(=4x-2)$ oe or $3x+3+4x-2=5$ M1 (dep) for collecting like terms on each side of the equation eg $3x+4x = 5 -3 +2$ or $7x + 1 = 5$ or $7x = 4$ A1 for $\frac{4}{7}$ or 0.57…

Q6

Question	Working	Answer	Mark	Notes
		Polygon drawn	2	B2 for correct frequency polygon (B1 for points plotted at correct midpoints of intervals or joining points at correct heights consistently within intervals including plotting at end values or correct frequency polygon with one point incorrect or correct frequency polygon with first and last points joined directly) NB ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted

Q7.

		Working	Answer	Mark	Notes
		$\frac{15+18}{160}\times 30$	6	3	M1 for finding the proportion of the stratum e.g. $^{15}/_{160}$ Or $^{18}/_{160}$ or $\frac{15+18}{160}$ OR for finding the proportion of the population eg $^{30}/_{160}$ × 100 or 18.75% M1 for completing their method to find the sample size e.g $\frac{15+18}{160}$ × 30 oe or 18.75÷100×(15+18) or sight of 6.1(875) A1 cao

Q8

Question		Working	Answer	Mark	Notes
		Top Cat = 35 × 4 = 140° Katkins = 30 × 4 = 120° Coolkat = 15 × 4 = 60°	Pie chart	3	M1 for 360 ÷ 90 or 4 seen or one angle (TC or Ka or Co) correct in pie chart ± 2° ignore labels, or one correct angle calculated A1 for any two angles (TC or Ka or Co) correct in pie chart. ± 2° ignore labels A1 for fully correct and labelled pie chart. All angles ±2°

Q9

PAPER: 1MA0_2H					
Question		Working	Answer	Mark	Notes
*			Yes, average speed could have been as high as 80.622...	5	B1 for 4535 or 4534.999... or 202.5 M1 for 4535 (oe) ÷ 202.5 M1 for ×3600 and ÷1000 A1 for 80.622... C1 (dep on first M1) for correct conclusion from their calculations

Q10.

Question		Working	Answer	Mark	Notes
	(a)		(4), 11, 24, 36, 40	1	B1 for all correct
	(b)			2	B1 ft for 4 or 5 "points" plotted correctly ± ½ full (2mm) square at the end of interval dep on sensible table (condone 1 addition error) B1 (dep) for points joined by curve or line segments provided no gradient is negative Ignore any part of graph outside the range of their points (SC: B1 if 4 or 5 points plotted not at end but consistent within each interval and joined)
	(c)		36.5 to 38 (inc.)	1	B1 for an answer in the range 36.5 to 38 (inc.) or ft (dep on graph being cf) for reading from graph at 20 ± 1 full (2mm) square

Q11.

5MB1H_01					
Question		Working	Answer	Mark	Notes
	(a)		(20), (30), 45, 60, (48)	2	M1 for frequency = fd × column width, can be implied by 1 frequency correct OR fd correctly marked on vertical axis 2cm=1unit OR identifying 1 cm² as frequency of 5oe A1 45 and 60 both correct
	(b)		histogram bars	2	B2 for 2 correct histogram bars; heights at 6cm and 2.4cm (B1 1 correct bar)
	(c)	Area method: Total area 40.6 cm² For median: ÷2 = 20.3 0 to 40 is 19 cm² median lies 41–43 OR Proportionality method: Total 203 ÷ 2 = 101.5; 0 to 40 is 95 40–60: 6.5÷60×20=2.16 Median is 40+2.16 = 42.16 OR 204÷2=102; 0 to 40 is 95 40-60: 7÷60×20=2.3… Median is 40+2.33=42.33	41 – 43	2	Area method: M1 ft for calculation of total area and division by 2 (eg 40.6÷2 or 20.3) A1ft answer 41–43 OR Proportionality method: M1 ft for 203÷2=101.5 and 6.5÷60×20=2.16 or 204÷2=102 and 7÷60×20=2.33… A1 ft answer 41–43

Q12.

5MB1H_01					
Question		Working	Answer	Mark	Notes
	(a)	Lowest = 16 LQ = 20 Median = 28 UQ = 42 Highest = 50	Box plot drawn	3	B3 for fully correct box plot (B2 for at least 3 correctly plotted values including box and whiskers/ tails) (B1 for at least 2 correctly plotted values including box or whiskers/tails or 5 correct values plotted and no box or whiskers/tails)
	(b)			2	C2 ft for two relevant comparisons one for median/average and one for IQR or range (C1ft for one relevant comparison) ie IQR or range or use of median for comparison

Q13.

Paper: 5MB3H_01					
Question		Working	Answer	Mark	Notes
			enlargement scale factor 3 centre *O*	3	B1 for enlargement B1 for scale factor 3 B1 for (centre) *O* oe NB: B0 for any combination of transformations

Q14.

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
			Triangle with vertices at (−1,−4), (−1,−5), (−3,−4.5)	2	M1 for correct shape and size and the correct orientation in the wrong position or two vertices correct A1 cao

Q15.

PAPER: 1MA0_2H					
Question		Working	Answer	Mark	Notes
	(a)		65	5	M1 for splitting up the cross section into separate areas and a method to find the area of one part OR for splitting up the pool into smaller prisms and a method to find the volume of one small prism, e.g. a cuboid M1 (dep) for a complete method to find the area of the cross section [with correct dimensions] OR for a method to find the total volume of more than one correct prism M1 (dep) for a complete method to find the volume of the pool [with correct dimensions] (= 195) M1 for "195" × 1000 ÷ 50 (=3900) oe where "195" comes from a volume A1 cao
	(b)		C	1	B1 cao

Q16.

Question		Working	Answer	Mark	Notes
	(a)	9×6	54	2	M1 for a method to find the speed e.g 9 ÷ 10, 9 ÷ 0.16 A1 cao
	(b)		Graph completed	3	B1 horizontal line from (30,21) to (45,21) M1 for a complete method to show the return journey is 30 mins or ½ hour evidenced by the line on the graph or by calculation A1 Correct line drawn from Luscoe (x,21) to (x + 30,0)

Q17

Question	Working	Answer	Mark	Notes
(a)	$5\sqrt{9\times3}$	$15\sqrt{3}$	2	M1 for sight of $\sqrt{9\times3}$ or $\sqrt{9}\ \sqrt{3}$ or $3\sqrt{3}$ A1 for $15\sqrt{3}$ (accept n = 15)
(b)		$7\sqrt{3}$	2	M1 for $\frac{21\sqrt{3}}{\sqrt{3}\sqrt{3}}$ A1 for $7\sqrt{3}$ (accept $\frac{21\sqrt{3}}{3}$)

Q18

Question		Working	Answer	Mark	Notes
			3	2	M1 for an attempt to evaluate 2800 × 1.025^n for at least one value of n (with n > 1) OR $\frac{3000}{2800}$ (=1.0714..) and 1.025^n evaluated (n>1) OR finding at least two correct interest payments (ie 70 and 71.75) A1 cao

Q19.

5MB3H_01 November 2015					
Question		Working	Answer	Mark	Notes
			17.6	3	M1 for 8 ÷ 5 (=1.6) or 5÷8 (=0.625) M1 for (16 – 5) × "1.6" or for (16 – 5) ÷ "0.625" oe A1 cao

Q20.

Question	Working	Answer	Mark	Notes
*		Conclusion (supported)	5	M1 for finding the area of one rectangle which is not 6 × 10 eg 2×2.5 (=5) or 4×10 (=40) or 2.5×6 or 5×2 M1 for a complete method to find the total area eg 5+5+40 or 60−10 (=50) M1 for a complete method to find the number of tins needed eg "50" ÷ 5 ÷ 2.5 (=4) OR for a complete method to find the number of litres needed. eg "50" ÷ 5 (=10) OR for a complete method to find the area covered by 3 tins eg 3×2.5×5 (=37.5) A1 for 50 (m^2) **and** 4 (tins needed) **or** for 10 (litres) **and** 7.5 (litres) **or** for 50(m^2) **and** 37.5(m^2) C1 (dep M2) for a conclusion supported by their calculations

Q21

Question	Working	Answer	Mark	Notes
(a)	$^{15}/_{100}$ × 2400 = 360 2400 – 360 = 2040 2040 ÷ (1 + 2 + 5) = 255 255 × 1, 255 × 2, 255 × 5	Cement = 255 Sand = 510 Stone = 1275	4	M1 for $^{15}/_{100}$ × 2400 or $^{85}/_{100}$ × 2400 M1 for '2040' ÷ (1 + 2 + 5) M1 (dep on previous M1) for '255' × 1 or '255' × 2 or '255' × 5 either explicitly or with answer(s) on the answer line. A1 for all 3 correct masses
(b)*	255 × 30 – 6500 = 1150 so not enough OR 6500 ÷ 255 = 25.5 m^3 worth of cement Which is less than 30 so not enough OR 6.5 tonnes of concrete gives 6.5 × 8 = 52 tonnes of dry mixture 30 m^3 of concrete requires 30 × 2400 × 0.85 kg of dry mixture = 61200kg of dry mixture (=61.2 tonnes)	No, with justification	3	B1 for a correct conversion between kg and tonnes e.g. 6.5 tonnes = 6500 kg (but not 1 tonne = 1000 kg) M1 for '255' × 30 C1(dep on M1) for an answer of No (Yes), supported by (ft) calculations. OR B1 for a correct conversion between kg and tonnes e.g. 6.5 tonnes = 6500 kg (but not 1 tonne = 1000 kg) M1 for 6500 ÷ '255' C1(dep on M1) for an answer of No (Yes), supported by (ft) calculations OR M1 for 6.5 × 8 and 30 × 2400 × 0.85 B1 for a correct between kg and tonnes e.g. 61200 kg = 61.2 kg (but not 1 tonne = 1000 kg) C1 (dep on M1) for an answer of No (Yes), supported by (ft) calculations.

Q22

Question		Working	Answer	Mark	
		24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, **288** 36, 72, 108, 144, 180, 216, 252, **288**	12 boxes of book marks 8 packs of dust covers	4	M1 attempts multiples of either 24 or 36 (at least 3 but condone errors if intention is clear) M1 attempts multiples of both 24 and 36 (at least 3 but condone errors if intention is clear) M1 (dep on M2) for a division of 250 or 288 by 24 or 36, or counts up "multiples" (implied if answers reversed) A1 for 12 boxes of book marks, 8 packs of dust covers (accept 15b, 10p), (18b, 12p), etc. SC B1 for 11b, 7p

Q23.

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
		$AC^2 = 5^2 + 3^2$ $AC = \sqrt{25+9}$ (=5.83) $\frac{5}{5.83} = \frac{DB}{3}$ $DB = \frac{5}{5.83} \times 3$ (= 2.57) 5 + 3 + 5.83 + 2.57 = **OR** $AC = \sqrt{25+9}$ (=5.83) $\tan A = \frac{3}{5}$ $A = 30.96$ $\sin 30.96 = \frac{DB}{5}$ $DB = 5 \times \sin 30.96$ (= 2.57) 5 + 3 + 5.83 + 2.57 =	16.4	5	M1 for $(AC^2) = 5^2 + 3^2$ (=34) M1 for $\sqrt{25+9}$ or $\sqrt{34}$ (=5.83) M1 for $\frac{5}{'5.83'} = \frac{DB}{3}$ or $DB \times AC = 5 \times 3$ M1 for $(DB =) \frac{5}{'5.83'} \times 3$ A1 for 16.4 to 16.41 **OR** M1 for $(AC^2) = 5^2 + 3^2$ (=34) M1 for $\sqrt{25+9}$ or $\sqrt{34}$ (=5.83) M1 for using a correct trig ratio in an attempt to find angle A or angle C, e.g. $\tan A = \frac{3}{5}$, $\sin A = \frac{3}{'5.83'}$, $\cos C = \frac{3}{'5.83'}$ M1 for using DB in a correct trig ratio, e.g. $\sin'30.96' = \frac{DB}{5}$ A1 for 16.4 to 16.41

Q24

5MB2H November 2016					
Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
*	(180 – 120) ÷ 2 = 30 (180 – 30) ÷ 2	75°	4	M1 for method to find angle ADB (or angle ABD) (180 – 120) ÷ 2 A1 for 75 C1 (dep on M1) for Alternate angles are equal **or** co-interior (allied) angles add up to 180° C1 (dep on M1) for Base angles of an isosceles triangle are equal **and** Angles in a triangle add up to 180°	E

Q25.

Question		**Working**	**Answer**	**Mark**	**Notes**
			126	4	M1 for method to find exterior or interior angle of octagon M1 for method to find exterior or interior angle of pentagon M1 for complete method A1 cao

Q26.

PAPER: 1MA0_1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
*		40° with reasons	4	M1 for finding one related angle using parallel lines A1 for $x = 40(°)$ C2 for full reasons linked to appropriate method eg. alternate angles are equal **and** angles in a triangle add up to 180° eg. angles on a straight line add up to 180° **and** corresponding angles are equal **and** alternate angles are equal eg. co-interior (allied) angles add up to 180° **and** exterior angle of a triangle is equal to sum of interior opposite angles Other solutions may include reasons such as: vertically opposite angles are equal the sum of angles at a point is equal to 360° (C1 (dep on M1) for one appropriate reason linked to parallel lines)

Q27.

PAPER: 1MA0_1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
		18	4	M1 for a method to find the exterior angle of a pentagon eg. 360 ÷ 5 (=72) or the interior angle of a pentagon, eg. 180 – 360 ÷ 5 (= 108) A1 for 72 or 108 M1 (dep M1) for a fully complete method to find the required angle, *DCF* A1 for 18 or ft their interior or exterior angle

Q28.

PAPER: 5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
	(a)		5^{10}	1	B1 cao
	(b)		7^3	1	B1 cao

Q29.

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
			$5\frac{2}{3}$	4	M1 for $AB = 2x$ or $DC = 2x + 4$ or for $38 - 4$ M1(dep) for x + "x" + "$2x$" + "$2x + 4$" or for "$38 - 4$" ÷ 6 M1 for "$6x + 4$" = 38 A1 for $5\frac{2}{3}$ oe NB: Accept answers in the range 5.6 to 5.7 if M3 scored. SC if M0 then B2 for answer in range 5.6 – 5.7

Q30.

Question	Working	Answer	Mark	Notes
(a)	1 - (0.3 + 0.21 + 0.16 + 0.09) 0.24 ÷ 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" ÷ 4 A1 cao
(b)	0.3 × 0.16 + 0.16 × 0.3 + 0.21 × 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

Q31.

Paper_5MB1H_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
		$\frac{x+x+5+2x}{3}$	2	M1 for intention to add x, $x+5$, $2x$ or $4x+5$ seen or ambiguous answer eg "4x+5"÷3 A1 for $\frac{x+x+5+2x}{3}$ oe

Q32.

5MB1H_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
	$(x+x+3+2x) \div 3$	$\frac{x+x+3+2x}{3}$ oe	2	M1 $x+x+3+2x$ (=4x+3) oe or 4x+3÷3 oe A1 $\frac{x+x+3+2x}{3}$ oe

Q33.

Question		Working	Answer	Mark	Notes
		$(5 \times x + 7 \times y) \div 12$	$\frac{5x+7y}{12}$	2	M1 for $5 \times x$ or $7 \times y$ oe seen A1 for $\frac{5x+7y}{12}$ oe (ignore kg units)

Q34.

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
			38	5	M1 $3x - 5 = 19 - x$ M1 for a correct operation to collect the x terms or the number terms on one side of an equation of the form $ax + b = cx + d$ A1 for $x = 6$ M1 for substituting their value of x in the three expressions and adding **or** substituting their value of x after adding the three expressions A1 cao

Q35.

Question		Working	Answer	Mark	Notes
		$\frac{-6 \pm \sqrt{6^2 - 4 \times 3 \times -2}}{2 \times 3}$ $(x+1)^2 - 1 - \frac{2}{3} = 0$	0.29 and – 2.29	3	M1 for substitution of $a = 3$, $b = 6$, $c = -2$ into the formula or for completing the square (condone **one** sign error) M1 for $\frac{-6 \pm \sqrt{60}}{6}$ or $-1 \pm \sqrt{\frac{5}{3}}$ or in simplified form A1 for answers in the range 0.29 to 0.292 and – 2.292 to – 2.29

Q36.

Question	Working	Answer	Mark	Notes
(a)		Correct construction	2	M1 for correct construction arcs or bisector within guidelines but no (or incorrect) construction arcs A1 for bisector within guidelines with correct arcs shown
(b)		Correct construction	2	M1 for correct construction arcs or perpendicular within guidelines but no (or incorrect) construction arcs A1 for perpendicular within guidelines with correct arcs shown

Q37.

Question		Working	Answer	Mark	Notes
			Correct line drawn	2	M1 for two pairs of relevant arcs drawn A1 correct line drawn (with arcs) SC B1 Correct line no arcs visible

Q38

Question		Working	Answer	Mark	Notes
			Correct region shaded	3	M1 for a circle centre M or N (accept arc of sufficient length to define the region) M1 for circle centre M radius 5 cm **and** circle centre N radius 3 cm (accept arc of sufficient length to define the region) A1 for correct region shaded

Q39

		Working	Answer	Mark	Notes
			correct shaded region	2	B1 for arc of circle, centre oak tree, radius 4cm(±2mm) B1 for shaded region where the tree can be planted, bounded by sides of garden and arc of circle centre oak tree