# Countdown to your final Maths exam …
# Crossover part 4 (2020)

# Markscheme & Examiners Report

**Examiners Reports**

**Q1.** Many students correctly found 4.5% of 300. However not all could then divide their answer into 50 or repeatedly add to find out the number of years required. A few students used compound interest and there was a special case for this approach but centres are encouraged to ensure that students check they have answered the question asked.

**Q2.** The most efficient method of working out the final amount is to apply the compound interest formula. Candidates who did this were generally awarded full marks. There was an unfortunate error of thinking that the multiplier was 1.35 rather than1.035 that was not infrequent.
Some candidates who calculated interest year by year and added it on did get full marks but they were likely to pick up rounding errors on the way.
Many candidates do not understand the concept of compound interest and simply did 3 times £42.

**Q3.** In part (a), the correct answer of 3.202..... was the modal answer but this was often followed by incorrect rounding to 3 sig. figs (3.202 or 3.2 being the most common errors). Failure to get the correct answer in (i) was usually either a result of attempting to find the square root of 5.357..../1.673 or an attempt to do the complete calculation in one go using a calculator. An incorrect answer in (i) was often followed by correct rounding in (ii) although many still gave their answer correct to 3 decimal places by mistake. In part (b), the correct answer was seen more than not. Some gave a correct answer but not in standard form.

**Q4.** This question was a good discriminator. There were a good number of fully correct solutions but more frequently students scored only part or no marks because they did not fully understand the concept of compound interest or were unable to show a correct method for calculating $3\frac{1}{2}\%$ of a quantity.

**Q5.** In part (a) there were many different attempts at working out the answer. The most common error was to calculate simple interest for the second year as 1.5% of 200, rather than compound interest 1.5% of 206.60. A significant number of candidates scored M1 for £206.60 then made this error. This led to a common incorrect answer of 209.60. Less common errors included calculating a 4.8% increase on 200 (adding 3.3 and 1.5), and using 1.33 and 1.15, instead of 1.033 and 1.015, as multipliers or using 3⅓% as equivalent to 3.3. Most candidates rounded to the nearest penny, with some failing to do so and giving £209.699. Too many candidates continue to find percentages using non-calculator "stepped" methods.

Part (b) was rarely completed successfully. A large number of candidates attempted to subtract 12.5% from 225 and 5% from 535.50 to find the original amounts, with others adding 12.5% on to 225 and 5% to 535.50. Whether this is due to a lack of knowledge of the required method or an inability to understand the question is unclear. Those candidates who did appreciate that the original amounts were 112.5% and 105% usually went on to gain full marks, with some failing to gain the C mark as values were simply stated and no comparison given.

**Q6.** The most successful approach seen on this question was from those who used a multiplier of 0.8. Those who did generally showed evidence of $0.8^n \times 1200$ with $n = 4$. The more long-winded approach of taking off 20% of that year's cost for each year was also seen, although the success rate was lower. This was due mainly to poor arithmetic, although some miscounted the years and gave an answer of 5. Many candidates thought that the depreciation was linear.

**Q7.** This question was not as well done as we might wish and it appears a significant proportion of students are not sufficiently familiar with using a calculator to work out the value of complex expressions such as the one given in part (a).
In part (b) a good proportion of students seemed to confuse 4 decimal places with 4 significant figures. Some students who had an incorrect answer to part (a) were able to round their answer correctly and so recover a mark here.

**Q8.** Some candidates found this question more challenging. They could often find 10% and/or 5% but not always of the correct figures. A sizeable number calculated all their percentages from £20,000, either thinking the question was asking for simple interest, or just in error. Thus subtracting £3000 and then £2000 gaining the correct number of years by an incorrect method, this did not gain full marks.
Some candidates stopped after correctly calculating £15,300 and stated 3 years, this was deemed sufficient for full marks.

**Q9.** In part (a), many students were unable to evaluate $\sqrt[3]{42.875}$ correctly. The common incorrect answers were 19.64 from $3 \times \sqrt{42.875}$ 280.74 from $(\sqrt{42.875})^3$ and 6.547 from $\sqrt{42.875}$. Students were more successful in part (b) and the correct answer was often given with no intermediate working. The most common incorrect answer was 6.41, from keying in $3.4 \times 5.2 \div 2.6 - 0.39$. Some students gained one mark for evaluating either the numerator or the denominator correctly. Some obtained both 17.68 and 2.21 but did not know what to do with these values.

## Mark Scheme

**Q1.**

| 5MB3F/01 June 2015 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| | | 4 | 3 | M1 $\frac{4.5}{100} \times 300$ (=13.5) or $\frac{104.5}{100} \times 300$ (=313.5) oe<br>M1 50 ÷ "13.5" (=3.7) or at least 3 repeated addition of "13.5"<br>A1 cao<br><br>SCB1 for $1.045^n \times 300$ |

**Q2.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| | $1200 \times 1.035^3$<br><br>Or<br>$1200 \times 1.035 = 1242$<br>$1242 \times 1.035 = 1285.47$<br>$1285.47 \times 1.035 =$<br>1330.46 | 1330.46 | 3 | M2 for $1200 \times 1.035^3$<br>A1 1330.46 – 1330.47<br>Or<br>M1 $1200 \times 1.035$<br>M1(dep) for '1242' × 1.035 and '1285.47' × 1.035<br>A1 1330.46 – 1330.47<br>[SC: B1 for 42 or 84 or 126 or 1242 or 1284 or 1326 seen, if M0 scored] |

**Q3.**

| PAPER: 5MB3H_01 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| (a)(i) | | 3.202(17....) | 3 | B2 for for 3.202(17.....)<br>(B1 for 5.357 .. or 1.673... seen) |
| (a)(ii) | | 3.20 | | B1 for 3.20 or ft from "(a)" [Note: 3.2 only gets B0] |
| (b) | | $1.17 \times 10^{10}$ | 2 | M1 for $2.34 \times 5 \times 10^{(5+4)}$ or $11.7 \times 10^{(5+4)}$ or $234000 \times 50000$ (= 11700000000)<br>A1 for $1.17 \times 10^{10}$ |

**Q4.**

| 5MB1H_01 November 2015 | | | | | |
|---|---|---|---|---|---|
| Question | | Working | Answer | Mark | Notes |
| | | 2500 + 2500 × 3.5÷100 = 2500 + 87.50 = 2587.50<br>2587.50 + 2587.50 × 3.5 ÷ 100 = 2587.50 + 90.5625 | 2678.06 | 3 | M1 for 2500 × 1.035 or 2500 + 2500 × 0.035 oe or for 2587.5(0) or 87.5(0) or 8750 or 2412.5(0)<br>M1 (dep) for "2587.5" × 1.035 or for "2587.5" + "2587.5" × 0.035 or for "2578.5" + "90.56(25)" or for 2678 or 2678.1(0) or 2678.07 or 2678.06…<br>A1 cao<br>NB: if correct answer seen then ignore any extra years<br>Alternative method:<br>M2 for 2500 × $1.035^n$ where $n \geq 2$ or for 2678 or 2678.07 or 2678.06…<br>A1 cao |

**Q5.**

| PAPER: 1MA0_2H | | | | | |
|---|---|---|---|---|---|
| Question | | Working | Answer | Mark | Notes |
| | (a) | | 209.69 or 209.70 | 3 | M1 for $200 \times \frac{3.3}{100}$ oe or 200 × 1.033 or 6.6(0) or 206.6(0)<br>M1 (dep) for (200 + "6.6") × $\frac{1.5}{100}$ oe or 200 × 1.033 × 1.015 oe or 3.099 or 3.09 or 3.10 or an answer between 209.69 and 209.7<br>A1 for 209.69 or 209.7(0) |
| | (b) | Train Pay Diff<br>Old 200 510 310<br>New 225 535.50 310.50<br>Diff 25 25.50 50p | Comparison | 3 | M1 for method to find cost of tickets before increase eg $\frac{225}{1.125}$ (=200) oe or $\frac{225}{112.5} \times 12.5$ oe or pay before increase, $\frac{535.50}{1.05}$ (=510) oe<br>A1 for 25 (train) **and** 25.5(0) (pay) or 310 **and** 310.5(0)<br>C1 (dep on M1) ft for statement comparing rises leading to conclusion based on two comparable amounts eg pay increase greater than train increase |

**Q6.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | 1200× $0.8^4$ | 4 | 3 | M1 0.8 or 960 or 2160 seen<br>M1 for $0.8^n$ where *n* is 2 or greater or for 768 or 614.40<br>A1 cao and supported by working |

**Q7.**

| PAPER: 1MA0 2H | | | | |
|---|---|---|---|---|
| Question | Working | Answer | Mark | Notes |
| (a) | | 4.58006(9567) | 2 | M1 for 1.83 or 8.381(527307) or 4.6 or 4.58 or 4.580 or 4.5801<br>A1 for 4.58006(9567) |
| (b) | | 4.5801 | 1 | B1 ft provided at least 5 decimal places in (a) |

## Q9.

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | 20 000×0.85 = 17 000<br>17 000×0.9 = 15 300<br>15 300×0.9 = 13 770 | 3 | 4 | M1 for a complete correct method to find 15% of 20 000 (=3000) or 100-15 (=85)<br>M1 for a complete correct method to find 85% of 20 000 e.g. 20 000 – '3000' (=17000) or 20 000 × '0.85' (=17000)<br>M1 for a complete method to find 90% of '17 000'<br>A1 cao but MUST be supported: 3 without working scores 0 marks and 3 from incorrect working may gain some method marks. |

## Q10.

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (a) | | 3.5 | 1 | B1 cao |
| | (b) | | 8 | 2 | B2 cao<br>(B1 for 17.68 or 2.21) |