| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| 10 (a) | | 10 | B1 | accept ±10 |
| (b) **Q1** | | 25 | M1 | for $(\sqrt[3]{125})^2$ **or** $\sqrt[3]{125} = 5$ **or** $125^2 = 15625$ **or** $\sqrt[3]{125^2}$ |
| | | | A1 | cao |

**Paper: 1MA1/2H**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 6 (a) | | 6 | B1 | cao |
| (b) | | 5 | B1 | cao |
| (c) | | Shown | M1 | for writing $100^a$ or $1000^b$ as a power of 10 ($=10^{2a}$ or $10^{3b}$) or $10^{2a+3b}$ or $100 = 10^2$ and $1000 = 10^3$ |
| **Q2** | | | C1 | for complete chain of reasoning leading to conclusion |

**Paper: 1MA1/1H**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| 12 (a) <br><br> **Q3** | | $\dfrac{1}{9}$ | M1 <br><br> A1 | for showing a method using either reciprocal or square root e.g. $\dfrac{1}{n}$ or 9 seen <br><br> cao Accept $\pm\dfrac{1}{9}$ or 0.1 recurring |
| (b) | | $\dfrac{16}{25}$ | M1 <br><br><br> A1 | for showing cube root of 64 as 4 and the cube root of 125 as 5 <br> or $\dfrac{16}{n}$ $(n \neq 25)$ or $\dfrac{n}{25}$ $(n \neq 16)$ or an intention to find the cube root and square. <br><br> cao Accept 0.64 |

| Paper: 1MA1/2H | | | | |
|---|---|---|---|---|
| Question | Working | Answer | Mark | Notes |
| 18 Q4 | | 1.45 | P1 | for converting to a common base with at least one correct conversion, eg. $(16 =) 2^4$ or $(8 =) 2^3$ |
| | | | P1 | (dep) for correct use of index laws to derive an equation, eg. $4 \times \frac{1}{5} + x = 3 \times \frac{3}{4}$ oe |
| | | | A1 | for 1.45 oe (accept $2^{1.45}$) OR |
| | | | P1 A2 | for a process to find the value of $2^x$ , eg. $8^{\frac{3}{4}} \div 16^{\frac{1}{5}} = 2.73\ldots$ for 1.45 oe (accept $2^{1.45}$) |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 9 (a) | 6 | B1 | cao | Accept ±6 |
| (b) | 1 | B1 | cao | |
| (c) **Q5** | $\dfrac{1}{9}$ | M1 | for evidence of working with a cube root <br> eg $\sqrt[3]{27}$ or $\sqrt[3]{729}$ <br><br> **OR** evidence of working with a reciprocal <br> eg $\dfrac{1}{27^{2/3}}$ or $\left(\dfrac{1}{27}\right)^{\frac{2}{3}}$ | |
| | | A1 | cao | |

| Paper: 1MA1/2H | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 1 | (a) | $m^7$ | B1 | cao | |
| | (b) | $125n^3p^9$ | B2 | cao | Allow multiplication signs |
| **Q6** | | | (B1 | for 2 of 3 terms correct in a single product) | $125n^3p^x$ or $125n^xp^9$ where $x \neq 0$ or $an^3p^9$ where $a$ is a number |
| | (c) | $8q^6r^3$ | B2 | cao | Allow multiplication signs |
| | | | (B1 | for 2 of 3 terms correct in a single product) | $8q^6r^x$ or $8q^xr^3$ where $x \neq 0$ or $aq^6r^3$ where $a$ is a number |

**Paper: 1MA1/3H**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 12<br><br><br>**Q7** | Explanation | C1 | for explanation eg needs to find 4th root or gives the correct answer of 2.828…<br>**Acceptable examples:**<br>He needs to find $\sqrt[4]{64}$<br>It should be 2.8..(or $2\sqrt{2}$)<br>It is not asking for $64 \div 4$, it is asking what number to the power of $4 = 64$<br>$64^{\frac{1}{4}}$ means the fourth root not a quarter of 64<br>$64^{\frac{1}{4}}$ means square root and square root again, not divide by 4<br>**Not acceptable examples:**<br>It should be 2<br>The expression is 64 to the power of $\frac{1}{4}$<br>$64^{\frac{1}{4}}$ is not a $\frac{1}{4}$ of 64 | |

**Paper: 1MA1/1H**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 11 (a) | 300 | M1 | for working out $\sqrt[4]{81}$ as 3 **or** $\sqrt[4]{10^8}$ as $10^2$ or 100 | Mark may be awarded if operations are attempted on 8100000000 eg 300000000 |
| | | A1 | for 300 **or** $3 \times 10^2$ or $3 \times 100$ | |
| **Q8** (b) | $\dfrac{1}{8}$ | M1 | for showing a square root of 64 as 8 **or** recognition of the reciprocal eg $\dfrac{1}{n}$ **or** shows expressions that show an understanding of the ½ index and the minus index eg $\dfrac{1}{\sqrt{64}}$ or other equivalent forms | |
| | | A1 | oe | Accept $\pm\dfrac{1}{8}$ oe |
| (c) | $3^{2-n}$ | M1 | for $3^{2(n-1)}$ **or** $3^{2n-2}$ **or** $\left(3^2\right)^{n-1}$ | |
| | | A1 | for $3^{2-n}$ oe eg $3^{n-2(n-1)}$ | |

| Paper: 1MA1/2H | | | | | |
|---|---|---|---|---|---|
| **Question** | | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 10 (a) **Q9** | | 1 | B1 | cao | |
| (b) | | $\dfrac{8}{x-4}$ | B1 | cao | |
| (c) | | $27n^{12}w^6$ | B2 | cao | |
| | | | (B1 | for two of 27, $n^{12}$, $w^6$ in a product) | |

| Paper: 1MA1/3H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 1 (a) | $n^8$ | B1 | cao | |
| (b) | $cd^3$ | M1 | for partial simplification, eg $c$ or $d^3$ | May be seen as simplification in original fraction |
| **Q10** | | A1 | for $cd^3$ | Accept $c^1d^3$ |
| (c) | $x > \dfrac{14}{5}$ | M1 | for $5x > 14$ or $5x = 14$ or critical value, $\dfrac{14}{5}$ oe | Must see carried out correctly, ie at least $5x > 7 \times 2$ not just intention seen. Allow other signs for this mark. |
| | | A1 | $x > \dfrac{14}{5}$ or $x > 2\dfrac{4}{5}$ or $x > 2.8$ | |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 9 (a) | 1 | B1 | cao | |
| (b) | 3 | B1 | cao | |
| **Q11** (c) | $\frac{1}{16}$ | B1 | oe | |
| (d) | 3 | B1 | cao | |

| Paper: 1MA1/3H | | | | |
|---|---|---|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 12 | 49, 2 | P1 | for setting up $6 \div n = 3$ oe **or** $7^n = a$ oe **or** one correct answer | |
| **Q12** | | A1 | cao | Accept the figures written as a complete statement eg $\left(49x^6\right)^{\frac{1}{2}}$ |

**Paper: 1MA1/1H**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 1 <br><br> **Q13** | 9 | M1 <br><br><br><br><br> A1 | for a correct first step, using the laws of indices to simplify <br><br> eg. $3^2$ or $3^{7+\,-2}$ or $3^{7-3}$ or $3^{-2-3}$ <br><br> OR for using exact values, eg. $2187 \times \frac{1}{9} (= 243)$ or $2187 \div 27 (= 81)$ or $\frac{1}{27 \times 9} (= \frac{1}{243})$ <br><br> cao | |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| Question | Answer | Mark | Mark scheme | Additional guidance |
| 14 (a) | $\dfrac{8}{27}$ | M1 | for showing the 4th root of 16 as 2 **and** the 4th root of 81 as 3 **or** $\dfrac{8}{n}$ $(n \neq 27)$ **or** $\dfrac{n}{27}$ $(n \neq 8)$ **or** an intention to find the 4th root and cube, eg. $\sqrt[4]{\left(\dfrac{16}{81}\right)^3}$ or $\left(\sqrt[4]{\dfrac{16}{81}}\right)^3$ oe | |
| | | A1 | cao | |
| (b) | 0 | M1 | for writing $\dfrac{1}{9} = 3^{-2}$, $9\sqrt{3} = 3^{2.5}$, $\dfrac{1}{\sqrt{3}} = 3^{-0.5}$ as powers of 3, with at least 2 correct **or** for working out $\dfrac{1}{9} \times 9\sqrt{3} \times \dfrac{1}{\sqrt{3}} = 1$ | |
| | | A1 | cao | |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 7    (a)<br><br>(b)<br><br>**Q15** | $p^{10}$<br><br>$2x^4y^2$ | B1<br><br>M1<br><br><br><br>A1 | cao<br><br>for any two of $12 \div 6\ (= 2)$, $x^{7-3}\ (= x^4)$, $y^{3-1}\ (= y^2)$ in a single product or written as a fraction with complete and correct cancelling of at least two terms<br><br>cao | |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 19<br><br>**Q16** | $\dfrac{3}{4}$ oe | P1<br><br><br>P1<br><br><br>A1 | for a first step to converting to a common base with one correct conversion, eg. $9^{-\frac{1}{2}} = 3^{-1}$ or $\frac{1}{3}$ or $27^{\frac{1}{4}} = 3^{\frac{3}{4}}$ oe<br><br>(dep) for $3^{-1} = 3^{\frac{3}{4}} \div 3^{x+1}$ oe<br><br>cao | $9^{-\frac{1}{2}} = 3^{-1}$ (or $\frac{1}{3}$) oe or $27^4 = 3^4$ oe seen alone gets the P1 |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 3<br><br><br>**Q17** | $2^6$ | M1<br><br><br>A1 | for the start of a method of simplification,<br>eg $2^{-5+8}$ (= $2^3$) or $2^{-5\times2}$ (= $2^{-10}$) or $2^{8\times2}$ (= $2^{16}$)<br><br>cao<br><br>SC B1 for answer of 64 or $8^2$ or $4^3$ if M0 scored. | |

| Paper: 1MA1/1H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 17 | $\dfrac{16}{81}$ | M1 | for showing the cube root of 8 = 2 **and** the cube root of 27 = 3<br><br>**or** an intention to find the cube root and raise to power 4<br><br>eg $\sqrt[3]{\left(\dfrac{8}{27}\right)^4}$ or $\left(\sqrt[3]{\dfrac{8}{27}}\right)^4$ or $\left(\dfrac{2}{3}\right)^4$ | |
| **Q18** | | A1 | cao | |

| Paper: 1MA1/3H | | | | |
|---|---|---|---|---|
| **Question** | **Answer** | **Mark** | **Mark scheme** | **Additional guidance** |
| 14 (a) | $81x^{20}y^{24}$ | B2 | cao | |
| | | (B1 | for two of 81, $x^{20}$, $y^{24}$ ) | |
| (b) **Q19** | $x^3+3x^2-10x-24$ | M1 | for method to find the product of any two linear expressions (3 out of 4 terms correct or 4 correct terms ignoring signs), eg $x^2 + 2x - 3x - 6$ or $x^2 + 2x + 4x + 8$ or $x^2 + 4x - 3x - 12$ | Note that, for example $-x - 6$ in expansion of $(x + 2)(x - 3)$ is regarded as 3 correct terms. |
| | | M1 | for a complete method to find all terms, at least half of which are correct (ft their first product), eg $x^3 + 4x^2 + 2x^2 - 3x^2 + 8x - 6x - 12x - 24$ | First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly |
| | | A1 | cao | |

**Paper: 1MA1/1H**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 18<br><br>**Q20** | 16 | M1 | for working with square root **or** with reciprocal in $\left(5\frac{4}{9}\right)^{-\frac{1}{2}}$<br><br>eg $\left(\frac{9}{49}\right)^{\frac{1}{2}}$ or $\dfrac{1}{\sqrt{\frac{49}{9}}}$ or $\dfrac{1}{\left(\frac{49}{9}\right)^{\frac{1}{2}}}$ or $\left(\frac{7}{3}\right)^{-1}$ or $\frac{3}{7}$ | |
| | | M1 | for a full method to simplify the numerator eg $\frac{3}{7}\times\frac{14}{3}\,(=2)$ | |
| | | M1 | for showing $\div 2^{-3}$ as $\times 8$, eg $\frac{3}{7}\times\frac{14}{3}\times 8$<br><br>**or** for $2^{1}\div 2^{-3}\,(=2^{4})$<br><br>**or** for correctly reducing the expression to a single calculation,<br>eg $\frac{336}{21}$ or $\frac{112}{7}$ or $2\div\frac{1}{8}$ | May be seen at any time during the calculation |
| | | A1 | cao | Award 0 marks for a correct answer with no supportive working |

**Paper: 1MA1/3H**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| 9 (a) | $10^{60}$ | M1 | for a correct first step using one of the rules of indices,<br>eg. $10^{150} \times 10^{90} = 10^{240}$ or $10^{360} \div 10^{150} = 10^{210}$ or $10^{360} \div 10^{90} = 10^{270}$<br>or $\sqrt{10^{360}} = 10^{180}$ or $\sqrt{10^{150}} = 10^{75}$ or $\sqrt{10^{90}} = 10^{45}$ | |
| | | M1 | for correct use of rules of indices leading as far as $\sqrt{10^{120}}$ or $\frac{10^{180}}{10^{120}}$ | |
| | | A1 | cao | |
| (b) | reason | C1 | for correct reasoning<br><br>**Acceptable examples**<br>eg should do $50 \times 2$ (not $50^2$)<br>   because $(12^{50})^2 = 12^{100}$<br>   because when you have a power inside and outside the bracket you times them<br>   because $\left(a^b\right)^c = a^{bc}$ (not $a^{b^c}$)<br><br>**Not acceptable examples**<br>   because you need to multiply everything in the brackets by 2<br>   because he should have squared 12 as well<br>   you add the powers instead of timesing | |

**Q21**