| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 1 | a |  | *y* (*y* + 27) | B1 |  |
|  | b |  | *t*6 | B1 |  |
|  | c |  | *w5* | B1 |  |
| 2 |  | 16 ÷ 4 |  $\frac{5}{8}$  | P1 | Using side lengths of 4 |
|  |  | $\frac{1×4}{2} $=2 or $\frac{1}{2}$×$\frac{1}{4} $= $\frac{1}{8} $$\frac{2×4}{2} $=4 or $\frac{1}{2}$×$\frac{1}{2} $= $\frac{1}{4} $ |  | P1 | Method to find fraction or area for one unshaded triangle |
|  |  | $\frac{1×4}{2}$ +$ \frac{2×4}{2}$ = 6 or $\frac{1}{2}$×$\frac{1}{4} $+ $\frac{1}{2}$×$\frac{1}{2} $= $\frac{3}{8} $ |  | P1 | Method to complete fraction or area for total unshaded region |
|  |  | 16 – 6 = 10 or 1 − $\frac{3}{8}$ = $\frac{5}{8}$ |  | P1  | Method to find total fraction or area for shaded region |
|  |  |  |  | A1 | for $\frac{5}{8}$ oe or 0.625 |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 3 | a | $\frac{1}{6}$ × $\frac{1}{5}$ × 30 ×5 = 5($\frac{5}{6}$ × $\frac{1}{5}$ + $\frac{1}{6}$ × $\frac{4}{5}$ +$ \frac{1}{6}$ × $\frac{1}{5}$ )×30×2 30 – 5 – 20 | 5 | P1P1P1A1 | for identifying correct process to find probabilities for winnng scores. May include use of tree diagram or sample spacefor correct process to find prize moneyfor completing correct process to find profit |
|  | b |  | Explanation | C1 | for appropriate comment to interpret result eg probability so only likelihood not certainty, other than 30 may play, £5 is small difference. |
| 4 |  |  | No with reasoning | M1M1 | Derive *AC*=9 cm and identify as hypotenuse42 + 72 |
|  |  |  |  | A1 | for using eg *AC* =$ \sqrt{4^{2}+7^{2}}$ or 65 and 81  |
|  |  |  |  | C1 | for concluding explanation that *ABC* is not a right-angled triangle with evidence. |
| 5 |  |  | 500g | P1 | $\frac{1}{8}$ × 160 (=20) |
|  |  |  |  | P1 | ‘20’ × 25 |
|  |  |  |  | A1 | 500 (or 0.5) |
|  |  |  |  | B1 | Correct units g (or kg) |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 6 | a |  | 7$\frac{1}{2}$ | M1 | $\frac{9}{4}$×$\frac{10}{3}$ oe |
|  |  |  |  | M1 | $\frac{90}{12}$ oe |
|  |  |  |  | A1 | 7$\frac{1}{2}$ |
|  | b |  | 5$\frac{1}{4}$ + 6$\frac{2}{3}$ or 5$\frac{2}{3}$ + 6$\frac{1}{4}$ | B1 | 5$\frac{1}{4}$ + 6$\frac{2}{3}$ or 5$\frac{2}{3}$ + 6$\frac{1}{4}$ |
| 7 |  | $\frac{90}{2}$ × 3 =135  | Combination with reason | P1 |  Links either $\frac{2}{3}$ with 90 and 60% with 84 |
|  |  | $\frac{84}{60}$ × 100 =140 |  | P1 | Process to find original price of microwave oven eg $\frac{90}{2}$ × 3 (=135) |
|  |  |  |  | P1 | Process to find original price of combination oven eg $\frac{84}{60}$ × 100 (=140) |
|  |  |  |  | A1 | Correct original prices £135 and £140 with interpretation of results to conclude that combination oven had greater normal price. |
| 8 |  |  | 4 - 4.5 | B1 | Rounds appropriately using two of 5, 2 or 7 |
|  |  |  |  | M1 | $$\sqrt{19}$$ |
|  |  |  |  | A1 | 4 - 4.5 |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 9 |  | *x*×2*x*×3*x*= | Reasoning to reach *x* ≤ 5 | M1 | Starts reasoning to find volume in terms of x |
|  |  |  |  | M1 | Gives inequality 6*x*3 ≤ 900 or substitutes 5 and 6 into 6*x*3 |
|  |  |  |  | M1 | Completes reasoning to show x ≤ 5  |
| 10 |  |  | 9 | M1 | Finds constant 36 × 1.5 (=54) or $\frac{6}{1.5}$=4 |
|  |  |  |  | M1 | 54 ÷ 6 or 36 ÷ 4 |
|  |  |  |  | A1 | 9 cao |
| 11 |  | $\frac{4}{3×2}$ $πx^{3}$+ $\frac{4}{3}$ $πx^{3}$=2$ πx^{3}$ | *h* = $\frac{x}{2}$ | P1 | Process to find volume of cone or hemisphere |
|  |  |  |  | P1 | Process to total volume of solid |
|  |  | (2*x*)2$ πh$ = 4*x*2$ πh$  |  | P1 | Process to find volume of cylinder |
|  |  | 4*x*2$ πh$ = 2$ πx^{3}$  |  | P1 | Equates 2 volumes |
|  |  |  |  | A1 | Reaches *h* = $\frac{x}{2}$ |
| 12 |  |  | Complete proof | M1 | Begins proof *BAE*=*ACD* and *ABE*=*EDC*  |
|  |  |  |  | M1 | *AB* = *DC* because opposite sides of a parallelogram are equal |
|  |  |  |  | C1 | Completes proof with all reasons eg alternate angles are equal and reference to ASA |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 13 |  |  | more than | C1 | Makes reference to different numbers of girls and boys  |
|  |  |  |  | C1 | Completes reasoning eg there are more (boys) with 80% than (girls) with 70% or correct mean (700+1200)÷25 = 76  |
| 14 |  |  | Completes reasoning | M1 | Expansion of $(4-\sqrt{3})(4+\sqrt{3})$ with at least 3 terms out of 4 correct or 42 − $\sqrt{3}$ × $\sqrt{3}$ |
|  |  |  |  | C1 | for  from correct working |
| 15 | a |  | 200 | B1  | 200 or 2 × 102 |
|  | b |  | 3 | B1 | 12 and $\frac{1}{4}$ |
|  |  |  |  | A1 | $3$ cao |
|  | c |  | −2 | M1 | 81 = 34 or   |
|  |  |  |  | A1 | cao |
| 16 |  |  | Events independent | C1 | Statement that events are independent |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 17 |  |  | 3 ± $\sqrt{17}$ | M1 | For (*x* − 3)2 – 9 – 8 (= 0) or$(x=)\frac{-(-6)\pm \sqrt{(-6)^{2}-4\left(1\right)(-8)}}{2(1)}$ allow sign error for *b* |
|  |  |  |  | M1  | For *x* – 3 = ± $\sqrt{17}$ or $x=\frac{6\pm \sqrt{68}}{2}$ |
|  |  |  |  | A1 | cao |
| 18 |  |  | 48 | P1 | Identifies that 16 ÷ 8 = 2 so *PL*=2*NP* |
|  |  |  |  | P1 | Process to find area of *LMN* 8 × (2+1)2 (=72) |
|  |  |  |  | P1 | Completes process to find area of *LQM*‘72’−16 − 8 |
|  |  |  |  | A1 | 48 cao |
| 19 | i |  | 18 | M1  | Uses frequency density for under 80 bar eg 7÷10  |
|  |  |  |  | M1 | Completes method to find over 105 minutes frequency eg 1.2 ×15 or $\frac{3}{4}$×(1.2×20) |
|  |  |  |  | A1 | 18 cao |
|  | ii |  | Reasoning | C1 | Correct explanation about grouped data so actual values between 100 and 120 unknown |

| **Paper 1MA1: 1H** |  |  |
| --- | --- | --- |
| **Question** | **Working** | **Answer** | **Notes** |
| 20 |  |  | 3*x* | M1 | Factorising numerator and denominator of first fraction $\frac{3(x+2)}{(x-5)(x+2)}$ ( =$ \frac{3}{(x-5)} $) |
|  |  |  |  | M1 | Factorising denominator of second fraction$\frac{x+5}{x(x+5)(x-5)}$ ( = $\frac{1}{x(x-5)}$ ) |
|  |  |  |  | M1 | Multiplication by reciprocal$\frac{3(x+2)}{(x-5)(x+2)}$ × $\frac{x(x+5)(x-5)}{(x+5)}$  |
|  |  |  |  | A1 | Completing algebra to reach 3*x* |
| 21 |  |  | *x* < −3, *x* > 6 | M1 | Rearrange to *x*2 − 3*x* – 18 > 0 |
|  |  |  |  | M1 | Correct method to solve *x*2 − 3*x* – 18 = 0 |
|  |  |  |  | M1 | Establish critical values −3 and 6 |
|  |  |  |  | A1 | *x* < −3, *x* > 6 |
| 22 |  |  | 60 | P1 | process to start problem eg draw diagram and find gradient of *OA* (= 3) |
|  |  |  |  | P1 | process to find equation of tangent with *m*= –1/‘3’ |
|  |  |  |  | P1 | process to find *x*-axis intercept of tangent |
|  |  |  |  | P1 | process to find area of triangle  |
|  |  |  |  | A1 | cao |