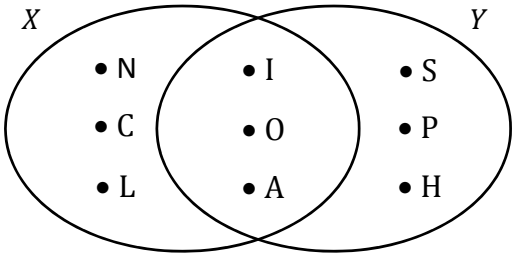
Model Solutions & Marking Notes

Note: The model solutions for each question are not intended to be exhaustive – there may be other correct solutions. Any Examiner unsure of the validity of the approach adopted by a particular candidate to a particular question should contact his / her Advising Examiner.

Q1	Model Solution – 20 Marks	Marking Notes
(a)	9 $1, 3, 9$ 10 $\mathbf{1, 2, 5, 10}$ 11 $\mathbf{1, 11}$ 12 $\mathbf{1, 2, 3, 4, 6, 12}$	**Scale 5D (0, 2, 3, 4, 5)** Accept correct answer without work *Low Partial Credit* • Any correct factor of 10, 11 or 12 *Mid Partial Credit* • Fully correct factors of 10, 11 or 12 *High Partial Credit* • Fully correct factors of any two of 10, 11 or 12.
(b)	Answer: $\mathbf{11}$ Reason: $\mathbf{11}$ has only two factors. **OR** $\mathbf{9}$, $\mathbf{10}$, and $\mathbf{12}$ have more than two factors. *or any other valid reason*	**Scale 5B (0, 2, 5)** *No Credit* • More than one box ticked, with no reason or incorrect reasoning. *Partial Credit* • 11 ticked, no or incorrect reason • 11 not ticked, shows understanding of prime
(c)&(d)	(c) Any three of $\mathbf{2, 3, 5, 7, 13, 17}$ or $\mathbf{19}$ (d) LCM of three numbers in (c)	**Scale 10C (0, 3, 7, 10)** *Low Partial Credit* • One or two correct primes less than 20 (including 11). • Three correct primes that include 11, if 11 is chosen in (b). • Work of merit in (d), for example: common multiple of chosen values other than LCM *High Partial Credit* • (c) or (d) correct

Q2	Model Solution – 25 Marks	Marking Notes
(a)		**Scale 10D (0, 2, 4, 8, 10)** *Low Partial Credit* • One correctly placed element *Mid Partial Credit* • Four correctly placed elements • Either of the sets, $X \cap Y, X \backslash Y$ or $Y \backslash X$ correct *High Partial Credit* • Seven correctly placed elements • Two of $X \cap Y, X \backslash Y$ or $Y \backslash X$ correct
(b)-(c)	(b) *A set with any two of I, O, and A.* (c) *A subset of X with at most one of I, O, and A.*	**Scale 5C (0, 2, 3, 5)** *Low Partial Credit* • Any correct element in (b) or (c) *High Partial Credit* • (b) or (c) correct
(d)	S2: Letters in X but not in Y. S3: $X \cup Y$	**Scale 10B (0, 5, 10)** *Partial Credit* • One correct answer

Q3	Model Solution – 25 Marks	Marking Notes
(a)	(i) $11 - 6 = 5$ $5 \times 2 = 10$ hours (ii) $95 \div 10 = €9{\cdot}50$ per hour (iii) $0{\cdot}7 \times 95 = 66{\cdot}50$ $95 - 66{\cdot}50 = €28{\cdot}50$ **OR** $0{\cdot}3 \times 95 = €28{\cdot}50$	**Scale 15D (0, 4, 8, 12, 15)** Accept correct answers without work. Accept correct answers without units. *Low Partial Credit* • Work of merit in one part, for example: 11 – 6, 0.70, 30%, 0.3, $95 \div k$ *Mid Partial Credit* • One part correct • Work of merit in three parts *High Partial Credit* • Two parts correct *Full Credit –1* • Apply a * for unnecessary rounding.
(b)	$20 \times 60000 \times 0{\cdot}7 = 840\,000$ $840\,000 = 8{\cdot}4 \times 10^5$	**Scale 10C (0, 3, 7, 10)** Accept correct answer without work. *Low Partial Credit* • Some correct multiplication, for example: $20 \times 60000 = 1200000$ • Shows some understanding of scientific notation, for example: converts 60000 to scientific notation • $20 \times 60000 \times 0.2$ *High Partial Credit* • 840000 • One correct multiplication **and** correctly converts to scientific notation

Q4	Model Solution – 35 Marks	Marking Notes
(a) (i)&(ii)	(i) Day 3 Day 4 Day 5 Day 6 20 25 30 35 (ii) Answer: Linear Reason: It goes up by the same amount each time. *or any other valid reason*	**Scale 15D (0, 4, 8, 12, 15)** Answer consists of 3 parts: the table in (i), the answer in (ii), the reason in (ii). *Low Partial Credit* • Any correct entry in (i) • Completes table correctly using an incorrect first difference. *Mid partial Credit* • 1 part (of the 3) correct *High Partial Credit* • 2 parts (of the 3) correct
(a) (iii)	$10 + 15 + 20 + 25 + 30 + 35 = €135$	**Scale 5B (0, 2, 5)** Accept correct answer without work. Accept correct answer without units. *Partial Credit* • Some calculation involving relevant values from the table
(b)	(i) Day 2 Day 3 Day 5 Day 6 4 8 32 64 (ii) Answer: Exponential Reason: It doubles each time. *or any other valid reason*	**Scale 10D (0, 2, 4, 8, 10)** Answer consists of 3 parts: the table in (i), the answer in (ii), the reason in (ii). *Low Partial Credit* • Any correct entry in (i) *Mid partial Credit* • 1 part (of the 3) correct *High Partial Credit* • 2 parts (of the 3) correct
(c)	Answer: Prize A Reason: It is the largest prize **OR** Answer: Prize C Reason: You don't have to wait to get all the money *or any prize with a valid reason*	**Scale 5A (0, 5)**

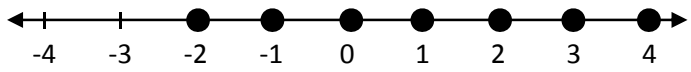
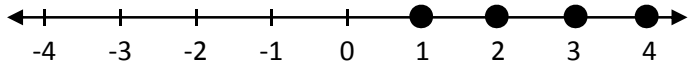
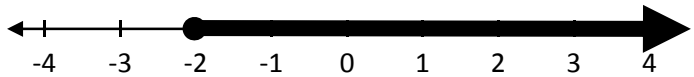
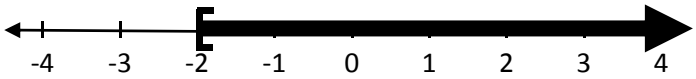
Q5	Model Solution – 20 Marks	Marking Notes
(a) (i)&(ii)	(i) $9:00 - 4 = 5:00$ a.m. (ii) $5:00 + 11:40$ $= 16:40$ **or** $4:40$ p.m. **OR** $9:00 + 11:40 = 20:40$ $20:40 - 4:00 = 16:40$ **or** $4:40$ p.m.	**Scale 15C (0, 4, 10, 15)** Accept correct answer without work Accept correct answers without a.m. or p.m. *Low Partial Credit* • Part (i) correct *High Partial Credit* • Part (ii) correct
(b)&(c)	(b) $756 \div 3 \cdot 6 = €210$ (c) Cost 2 adults = cost 4 children So cost of 6 children = 756 $756 \div 6 =$ R$126 per child ticket **OR** 1 adult and 1 child = $\frac{756}{2} = 378$ So cost 3 children = 378 $378 \div 3 =$ R$126 per child ticket **OR** $\boldsymbol{2x + 2y = 756}$ $\underline{\boldsymbol{x - 2y = 0}}$ $\boldsymbol{3x = 756}$ $x = 252$ and $y = 126$ R$126 per child	**Scale 5C (0, 2, 3, 5)** Accept correct answers without work. Accept correct answers without units. *Low Partial Credit* • Part (b) correct *High Partial Credit* • Part (c) correct

Q6	Model Solution – 30 Marks	Marking Notes
(a) (i)&(ii)	4 5 6 7 10 16 0 1 2 3 6 12 0 7 14 21 42 84	**Scale 20D (0, 5, 10, 15, 20)** *Low Partial Credit* • Any correct entry in table *Mid Partial Credit* • 4 correct entries • **(i)** or **(ii)** correct *High Partial Credit* • **(i)** or **(ii)** fully correct **and** some correct entries in other part *Full Credit –1* • Apply a * for one incorrect entry if the rest is fully correct
(b)	$\mathbf{105 \div 7 = 15}$ $\mathbf{15 + 4 = 19}$ years. **OR** 17 18 19 91 98 105 Answer: 19 years **OR** $\mathbf{7(E - 4) = 105}$ $\Rightarrow \mathbf{7E - 28 = 105}$ $\Rightarrow \mathbf{7E = 105 + 28 = 133}$ $\Rightarrow \mathbf{E = 133 \div 7 = 19}$ years	**Scale 10C (0, 3, 7, 10)** Accept correct answer without work *Low Partial Credit* • Some relevant use of 7 or 4 *High Partial Credit* • Finds Spot's age in years (i.e. 15) • Incorrect use of 7 but correct use of 4

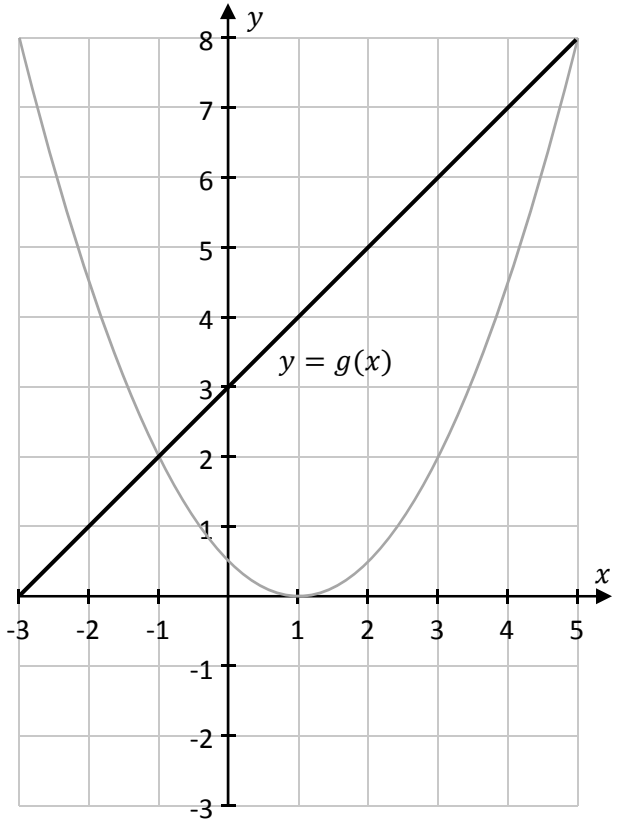
Q7	Model Solution – 15 Marks	Marking Notes
(a)&(b)	(a) Square 4 Hexagon 6 Triangle 3 (b) $\{3, 4, 5, 6\}$	**Scale 15D (0, 4, 8, 12, 15)** *Low Partial Credit* • One part correct in **(a)** • Any correct element in **(b)** *Mid Partial Credit* • Two parts correct in **(a)** • **(b)** correct *High Partial Credit* • **(a)** fully correct • **(b)** correct **and** one part of **(a)** correct

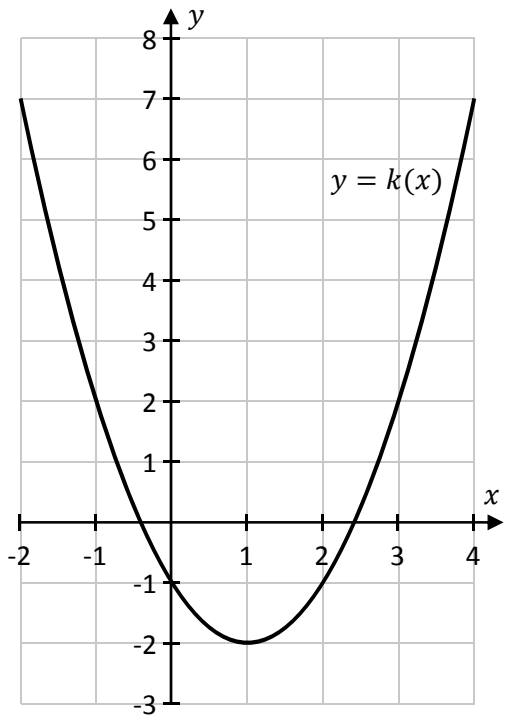
Q8	Model Solution – 15 Marks	Marking Notes
(a)	$\frac{2(4)+1}{3(4)-2} = \frac{8+1}{12-2} = \frac{9}{10}$	**Scale 5B (0, 2, 5)** *Partial Credit* • Fully correct substitution • Correct numerator or correct denominator
(b)	$(w+4)(3w-2)$ $= 3w^2 + 12w - 2w - 8$ $= 3w^2 + 10w - 8$	**Scale 10C (0, 3, 7, 10)** *Low Partial Credit* • One term correct, including sign. *High Partial Credit* • Two terms correct from solution, including signs

Q9	Model Solution – 40 Marks	Marking Notes
(a)	(i) 20 seconds (ii) 40 metres	**Scale 10B (0, 5, 10)** *Partial Credit* • One part correct
(b)	(i) A (ii) $\frac{10}{6} = \frac{5}{3}\ m/s$ $\frac{10}{6} = 1.66\ldots m/s$ (	**Scale 10C (0, 3, 7, 10)** Accept 1.7m/s in (ii). Accept correct answer in (ii) without units. *Low Partial Credit* • Part (i) correct *High Partial Credit* • Part (i) correct and work of merit in part (ii) • Part (ii) correct *Full Credit –1* • Apply a * for $\frac{10}{6}$ in (ii)
(c)	(i) 35 cm (ii) $2\pi r$ $= 2(\pi)(35)$ $= 219.9\ldots$ $=$ 220 cm [nearest cm]	**Scale 15C (0, 4, 10, 15)** *Low Partial Credit* • Part (i) • Work of merit in one part , for example: 70/2, $C = 2\pi r$ *High Partial Credit* • Part (ii) correct • Part (i) correct and work of merit in part (ii) *Full Credit –1* • Apply a * if the answer is not given correct to the nearest cm
(d)	60 m = 6000 cm $6000 \div 220 = 27{\cdot}27\ldots$ i.e. 27 times **OR** 220 cm = 2·2 m $60 \div 2{\cdot}2 = 27{\cdot}27\ldots$ i.e. 27 times	**Scale 5C (0, 2, 3, 5)** Accept correct answer without work Consider trial and improvement as division using relevant figures *Low Partial Credit* • One correct conversion • Division using relevant figures *High Partial Credit* • Conversion correct **and** sets up division *Full Credit -1* • Apply a * if the answer is not rounded down to the nearest whole number.

Q10	Model Solution – 15 Marks	Marking Notes
(a)–(c)	(a)  (b)  (c)  **OR**  	**Scale 15D (0, 4, 8, 12, 15)** Accept 0 as an element in (b) Accept correct answer without work *Low Partial Credit* • Any correct element in any part *Mid Partial Credit* • One part fully correct *High Partial Credit* • Two parts fully correct *Full Credit – 1* • Apply a * once only if -2 is excluded in (a) and/or (c)

Q11	Model Solution – 15 Marks	Marking Notes
(a)&(b)	(a) $(x+5)\,(x-1)$ (b) $(x+5)(x-1)=0$ $\Rightarrow \quad x+5=0$ **and** $x-1=0$ $\Rightarrow \quad x=-5$ **and** $x=1$	**Scale 15D (0, 4, 8, 12, 15)** *Low Partial Credit* • Work of merit in one part, for example: finds factors of x^2 or ± 5; or puts answers from (a) = 0 in (b) • Any correct substitution in quadratic formula *Mid Partial Credit* • (a) correct • Fully correct substitution in quadratic formula *High Partial Credit* • (a) correct and work of merit in (b) • (b) correct (2 roots)

Q12	Model Solution – 45 Marks	Marking Notes
(a)(i)		**Scale 15D (0, 4, 8, 12, 15)** Accept a tolerance of $\pm\mathbf{0.2}$ for non integer values. *Low Partial Credit* • Any integer valued point correctly calculated or plotted • Point correctly plotted from candidate's work. • States slope $= 1$ **or** y-intercept $= 3$ *Mid Partial Credit* • States slope $= 1$ **and** y-intercept $= 3$ • Any line passing through $(0, 3)$ **or** with slope of 1 • Two points correctly calculated but plotted incorrectly or not plotted *High Partial Credit* • Correct line but not filling the given domain • End-points correctly plotted but not joined or joined incorrectly
(a)(ii)	$(-1, 2)$ **and** $(5, 8)$	**Scale 5C (0, 2, 3, 5)** Allow use of graph and table to find the coordinates of the points of intersection. *Low Partial Credit* • Points clearly identified on graph • x or y ordinate correct in any one point • One point with coordinates reversed and second point incorrect *High Partial Credit* • One point correct • Co-ordinates reversed for both points (2, -1) **and** (8, 5)

Q12	Model Solution – 45 Marks	Marking Notes
(b)(i)	$k(3) = (3)^2 - 2(3) - 1$ $= 9 - 6 - 1$ $= 2$	**Scale 5B (0, 2, 5)** Accept correct answer without work *Partial Credit* • Any correct substitution • Sets $k(x) = 3$ and some other relevant work.
(b)(ii)		**Scale 20D (0, 5, 10, 15, 20)** Note: If a candidate uses a linear function award *Low Partial Credit* at most. *Low Partial Credit* • Work of merit in calculating any point • Correct shape of graph *Mid Partial Credit* • Two points with integer coordinates correctly calculated and plotted. • All points correctly calculated. *High Partial Credit* • Four points with integer coordinates correctly plotted