Mark Scheme

Q1.

Question	Working	Answer	Notes
		D: $15 - x$ P: $\frac{20+x}{2}$	M1 For writing a correct expression for D or P before sweets are eaten $20 - x$ or $20 + x$ A1 One correct expression A1 Both correct expressions

(Q18 1MA1/1F/S2, Specimen papers)

Q2.

Question	Answer	Mark	Mark scheme	Additional guidance
	13	P1	for beginning to process problem eg $72 - 7$ (= 65) **or** writing $5x + 7 = 72$ oe	
		P1	for a complete process eg "65" ÷ 5 oe **or** writes $5x = 65$ oe	
		A1	cao	

(Q11 1MA1/3F, June 2023)

Q3.

Question	Answer	Mark	Mark scheme	Additional guidance
	$6x + 7y$	M1	for $6x$ **or** $7y$ **or** a linear expression in the form $ax + by$ where $a, b > 0$	
		A1	for $6x + 7y$ oe	$T = 6x + 7y$ oe scores M1A0

(Q12 1MA1/3F, Nov 2024)

Q4.

Question	Answer	Mark	Mark scheme	Additional guidance
	$7y$	B1	for $7y$ oe	Accept $7 \times y$ oe Accept a formula, eg. $P = 7y$ but **not** $y = 7y$

(Q07 1MA1/2F, June 2019)

Q5.

Question	Answer	Mark	Mark scheme	Additional guidance
	$T = 5b + 28c$	M1	for $5b$ **or** $28c$ **or** T = a linear expression in b and/or c	Allow $5 \times b$ and $28 \times c$ throughout
		M1	for $5b + 28c$ **or** partially correct formula, eg $T = 5b\ (+ kc)$ oe **or** $T = 28c\ (+ kb)$ oe	
		A1	for $T = 5b + 28c$ oe	

(Q18 1MA1/1F, June 2023)

Q6.

Question	Working	Answer	Mark	Notes
		$L = 5a + 3$	M1	for expression $a - 1 + a + a + a + a + 4$ **or** L= an expression in a
			M1	for $5a + 3$ **or** $L = a + a + a - 1 + a + a + 4$ oe
			A1	for $L = 5a + 3$

(Q06 1MA1/1F, Nov 2017)

Q7.

Question	Answer	Mark	Mark scheme	Additional guidance
(a)	$T = 4n - 5$	M1	for $2n$ **or** $n - 5$ **or** T = a linear expression in n	Allow variables other than n
		M1	for $n + 2n + n - 5$ oe **OR** for T = an expression in n with 2 of 3 ages correct eg $T = n + n^2 + n - 5$	Each age must be an expression in n
		A1	for $T = 4n - 5$ oe eg $T = n + 2n + n - 5$	
(b)	$5m - 3m = 2m$	B1	for $5m - 3m = 2m$ indicated	

(Q18 1MA1/2F, Nov 2019)

Q8.

Question	Answer	Mark	Mark scheme	Additional guidance
(a)	$7c + 6d$	M1	for $7c$ **or** $6d$	
		A1	for $7c + 6d$	
(b)	7	M1	for correct method to expand, eg $5 \times 2m - 5 \times 6$, **or** divides both sides by 5 as a first step.	
		M1	for correct method to isolate terms in m, eg $10m - 30 + 30 = 40 + 30$	
		A1	cao	
(c)	$3x + 2y$	M1	for $3x$ or $2y$	Condone use of b and p
		A1	cao	

(Q14 1MA1/2F, Nov 2022)

Q9.

Question	Answer	Mark	Mark scheme	Additional guidance
	$b = \frac{2}{3}a + 2$	P1	for process to rearrange the equation to give y in terms of x eg $y = \frac{7-3x}{2}$ **or** $y = -\frac{3}{2}x + \left(\frac{7}{2}\right)$ **or** $m = -\frac{3}{2}$	
		P1	for using their gradient in $mm = -1$	
		P1	for showing a process to find the gradient of PQ eg $\frac{b-4}{a-3}$ **OR** for substituting $x = 3$ and $y = 4$ in $y =$ "$\frac{2}{3}$"$x + c$	
		P1	(dep P3) for forming an equation in a and b eg $\frac{b-4}{a-3} =$ "$\frac{2}{3}$" **or** $b =$ "$\frac{2}{3}$"$a +$ "2"	
			OR correct equation in terms of x and y eg $y = \frac{2}{3}x + 2$	$y - 4 = \frac{2}{3}(x - 3)$ gets P4
		A1	for $b = \frac{2}{3}a + 2$ oe	Accept 0.66 or 0.67 oe for 2/3

(Q19 1MA1/1H, June 2018)

Q10.

Question	Working	Answer	Mark	Notes
		$12p + 18b$	M1 A1	$12p$ or $18b$ or $p + b$ $12p + 18b$

(Q02 1MA1/3F, June 2017)

Q11.

Question	Working	Answer	Notes
(a)		9	M1 for – 12 and ÷ 7.80 A1 cao
(b)		$T = 7.8y + 12$	C1 for $7.8y + 12$ or T = linear expression in y C1 $T = 7.8y + 12$ oe

(Q14 1MA1/3F/S2, Specimen papers)

Q12.

Question	Working	Answer	Mark	Notes
		$5(3p + 7q)$	P1	for start to process, e.g. derivation of algebra using information, e.g. $3p + 7q$ or 50 divided in the ratio 3: 7
			P1	for process to find mass of 1 litre of R, e.g. $(3p + 7q) \div (3+7)$ or 15 : 35 oe
			A1	oe

(Q09 1MA1/1H/M2, Specimen papers)

Q13.

Question	Working	Answer	Notes
		complete chain of reasoning	C1 starts chain of reasoning eg finds area of large square and area of triangle or use of Pythagoras C1 for $(x + y)^2 - 4\times (x\times y\div 2)$ oe or $\sqrt{x^2 + y^2} \times \sqrt{x^2 + y^2}$ C1 complete chain of reasoning with correct algebra

(Q07 1MA1/3H/S2, Specimen papers)

Q14.

Question	Working	Answer	Mark	Notes
		$x^2 + 6x = 1$	M1	writes the area using algebraic terms e.g. $(x + 3) \times (x + 3)$ or at least two correct area expressions, may be written on the diagram or x given as $\sqrt{10} - 3$
			M1	expands and includes the given 10 e.g. $x^2 + 3x + 3x + 9 = 10$; condone one error in the four terms when expanding or $10 - 3\sqrt{10} - 3\sqrt{10} + 9 + 6\sqrt{10} - 18$ (=1) condone 1 error in the 6 terms
			A1	rearranges to give the given equation or shows surd expression simplifies to 1

(Q24 1MA1/1F, June 2017)

Q15.

Question	Answer	Mark	Mark scheme	Additional guidance
	$1-\left(\frac{1}{2}\right)^n$ $-\left(\frac{1}{2}\right)^n$	M1	for $\left(\frac{1}{2}\right)^n$ oe	
		A1	oe eg $1-\left(\frac{1}{2}\right)^{n-1}$	

(**Q20 1MA1/3H, Nov 2021**)

Q16.

Question	Working	Answer	Mark	Notes
		$3x + 1$	P1	process to start to problem, e.g. states perimeter algebraically, e.g. $2x + 3 + 5x - 2 + 5x + 3$
			P1	(dep P1) continues process, e.g. simplifies to $12x + 4$ or divides their linear expression (linked to perimeter) by 4
			A1	cao

(**Q20 1MA1/1F/M2, Specimen papers**)

Q17.

Question	Answer	Mark	Mark scheme	Additional guidance
	Shown	M1	for a start to the method, eg finds one correct area $4(x + 1)$ **or** $(x + 7)(2x + 6)$ **or** $(x + 1)(x + 11)$ **or** $(x + 7)(x + 5)$ **or** $4(x + 5)$ **or** $(x + 11)(2x + 6)$	
		M1	for a complete expression for the total area, eg $4(x + 1) + (x + 7)(2x + 6)$ **or** $4x + 4 + 2x^2 + 14x + 6x + 42$ **OR** $(x + 1)(x + 11) + (x + 7)(x + 5)$ **or** $x^2 + x + 11x + 11 + x^2 + 7x + 5x + 35$ **OR** $(x + 11)(2x + 6) - 4(x + 5)$ **or** $2x^2 + 22x + 6x + 66 - 4x - 20$	
		A1	for a complete chain of reasoning with fully correct algebra leading to $2x^2 + 24x + 46$	$2x^2 + 24x + 46$ is given so need to see brackets expanded correctly

(**Q14 1MA1/1H, Nov 2021**)

Q18.

Question	Answer	Mark	Mark scheme	Additional guidance
	$\frac{30w}{6-21w}$	P1	for forming an equation, eg $6(2w+y)=7w(3y+6)$ **or** $12w+6y=21wy+42w$ oe	Condone missing brackets for this mark
		P1	for expanding brackets correctly and gathering w terms or isolating y terms in a correct equation, eg $6y=21wy+30w$ **or** $6y-21wy=42w-12w$ **or** $6y-21wy=30w$	
		P1	(dep on two terms in y) for factorising out the y, eg $y(6-21w)=42w-12w$ **or** $y(6-21w)=30w$ **or** $3y(2-7w)=30w$	
		A1	for $(y=)\ \frac{30w}{6-21w}$ oe	

(**Q11 1MA1/1H, Nov 2021**)

Q19.

Question	Answer	Mark	Mark scheme	Additional guidance
	Result shown	M1	for method to find the number of yellow counters in bag **A**, eg $x \div 3 \times 5\ (=\frac{5x}{3})$ or for method to find the total number of counters in bag **A** eg $x \div 3 \times 8\ (=\frac{8x}{3})$ or for starting to work with ratio using algebra eg $3y$, $5y$	Could use any letter other than y apart from x
		M1	(dep) for method to find the total number of counters in bag **B**, eg $(x+\text{“}\frac{5x}{3}\text{”})\div 2\ (=\frac{4x}{3})$ or $\text{“}\frac{8x}{3}\text{”}\div 2\ (=\frac{4x}{3})$ or $(3y+5y)\div 2\ (=4y)$	For the method marks condone decimals that are rounded or truncated to 1dp
		C1	for complete method showing that total number of counters in bag **A** and bag **B** is $4x$, eg $\frac{8x}{3}+\frac{4x}{3}=4x$ or $3y+5y+4y=12y$ **and** $12y \div 3y \times x=4x$	For the C mark only accept values that are shown to be recurring and allow $3.\dot{9}x=4x$

(**Q10 1MA1/3H, June 2024**)

Q20.

Question	Answer	Mark	Mark scheme	Additional guidance
(a)	Full working seen	M1	for an initial step with the expressions eg doubling $2x + 1$ or $x + 2$ **or** halving $4x$ **or** for identifying CD as $x + 2$ **or** for identifying DE as $2x + 1$	May be seen in working or on diagram
		M1	for an expression for the total perimeter, eg $4x + 2 \times (2x + 1) + 2 \times (x + 2)$	
		C1	for full simplification and equating to 18	
(b)	1.2	M1	for isolating terms in x can ft an equation stated in (a) provided in form $ax + b = c$	$10x = 18 - 6$
		A1	for 1.2 oe	Accept $\frac{12}{10}$ or $\frac{6}{5}$

(**Q17 1MA1/3F, Nov 2018**)

Q21.

Question	Answer	Mark	Mark scheme	Additional guidance
	Complete chain of reasoning	M1	for (area of trapezium $TQRS$ =) $0.5 \times 4x \times (2x + 3x)$ or for (area of rectangle $TUVS$ =) $4x \times (3x + 5)$ $(= 12x^2 + 20x)$	Evidence for the award of marks may be seen on the diagram
		M1	for (area of trapezium $QUVR$ =) $4x(3x + 5) - 0.5 \times 4x \times (2x + 3x)$	
		C1	for correct algebraic processing and simplification to the given form	
		M1	**Alternative 1** for (QU =) $3x + 5 - 2x$ $(= x + 5)$	Alternative methods may be seen.
		M1	for (area of trapezium $QUVR$ =) $0.5 \times 4x \times$ (("$x + 5$") + 5) or $0.5 \times 4x \times (x + 10)$	
		C1	for correct algebraic processing and simplification to the given form	
		M1	**Alternative 2** for (area of triangle =) $0.5 \times (3x - 2x) \times 4x$ or for (area of rectangle =) $4x \times 5$	Accept x for $(3x - 2x)$
		M1	for (area of trapezium $QUVR$ =) "$0.5 \times (3x - 2x) \times 4x$" + "$4x \times 5$"	
		C1	for correct algebraic processing and simplification to the given form	

(**Q07 1MA1/3H, June 2022**)

Q22.

Paper 1MA1: 3F			
Question	Working	Answer	Notes
(a)	$2x + 2x - 2y + 2x + 2x - 2y$	Shown	M1 For method to acquire correct inside lengths C1 For completion
(b)	$8x$ and $4y$ are multiples of 4 Their difference must be a multiple of 4 Or $4(2x - y)$ is a multiple of 4	Shown	M1 For method to start argument eg. factorise expression C1 For complete argument

(**Q17 1MA1/3F/N, Specimen papers**)

Q23.

Question	Answer	Mark	Mark scheme	Additional guidance
(a)	3 hrs 16 mins	P1	196 – 60 – 60 – 60 (=16) oe **or** 196 ÷ 60 (= 3.26.. or 3.27…) **or** states 3 hours in their answer (with an incorrect number of minutes or minutes left blank)	
		A1	3 hours 16 minutes	
(b)	$\frac{x}{2}$	B1	$\frac{x}{2}$ oe	

(**Q11 1MA1/3F, Nov 2021**)

Q24.

Question	Answer	Mark	Mark scheme	Additional guidance
	$10x$	B1	for $10x$ oe	

(**Q13 1MA1/1F, June 2019**)

Q25.

Question	Answer	Mark	Mark scheme	Additional guidance
	$4\left(2+\sqrt{2}\right)a^2$	P1	for process to find area required and identifying 135° or 45° or 90° angle(s), eg splitting shape into square and 4 triangles and an angle relevant to the triangle clearly identified.	90° must be in a triangle to gain credit. May be seen on diagram.
		P1	for process to find the area of a relevant triangle using 45°, eg $\frac{1}{2}\times a\times\left(2\times\frac{a}{\sqrt{2}}\right)\times\frac{1}{\sqrt{2}}\left(=\frac{a^2}{2}\right)$ or using 90°, eg $\frac{1}{2}\times a\times a\left(=\frac{a^2}{2}\right)$ or process to find the area of a square made from 2 small triangles, eg $a\times a\left(=a^2\right)$	Accept $0.49\ldots a^2$ May be seen as the area of 2 squares (from 4 small triangles)
		P1	for process to find the length of the square, eg $a+a+\sqrt{a^2+a^2}\left(=2a+a\sqrt{2}\right)$	Accept $3.41a$
		P1	for process to find the total area, eg $\left("2a+a\sqrt{2}"\right)^2+4\times"\frac{a^2}{2}"$	Accept $(11.655+4\times0.49)\,a^2$
		A1	(dep on P3) for $4\left(2+\sqrt{2}\right)a^2$	Answer only award no marks. If working in decimals accept $\frac{13.656}{2+\sqrt{2}}$ leading to 4 Accept $p=4$ if supported by correct working

(**Q24 1MA1/2H, June 2023**)

Q26.

Question	Answer	Mark	Mark scheme	Additional guidance
(a)	Shown	M1	for finding one missing angle eg $BDE=y$ **or** $ODE=90$ **or** $ODF=90$ **or** $DBO=x$ **or** $BCD=180-y$ **or** (reflex) $BOD=2y$	Could be shown on the diagram or in working
		A1	for a complete correct method leading to $y-x=90$	
		C1	(dep on A1) for all correct circle theorems given appropriate for their working eg The tangent to a circle is perpendicular (90°) to the radius (diameter) Alternate segment theorem **OR** Angle at the centre is twice the angle at the circumference Opposite angles in a cyclic quadrilateral sum to 180°	
(b)	Explanation	C1	for explanation eg No as y must be less than 180 as it is an angle in a triangle	

(**Q13 1MA1/2H, June 2018**)

Q27.

Question	Answer	Mark	Mark scheme	Additional guidance
	Proof	P1	for start to process to find area of *ABCDEF*, eg area of equilateral triangle $= \frac{1}{2} \times x \times x \times \sin 60 \left(= \frac{\sqrt{3}}{4}x^2\right)$ **OR** for start to process to find area of *FGHIJK*, eg area of equilateral triangle = $\frac{1}{2} \times px \times px \times \sin 60 \left(= \frac{\sqrt{3}}{4}p^2x^2\right)$	Any correct process to find the area of part of the hexagon is acceptable for this mark, eg $\frac{1}{2} \times x \times x \times \sin 120$ or $\frac{1}{2} \times (x + 2x) \times \frac{\sqrt{3}}{2}x$ Allow sin 60 left in expressions for the first 3 marks.
		P1	for complete process of finding area of *ABCDEF*, eg $6 \times \frac{1}{2} \times x \times x \times \sin 60$ or $6 \times \frac{1}{2} \times x \times x \times \frac{\sqrt{3}}{2}$ $\left(= \frac{3\sqrt{3}}{2}x^2\right)$ oe **OR** for complete process of finding area of *FGHIJK*, eg $6 \times \frac{1}{2} \times px \times px \times \frac{\sqrt{3}}{2}$ $\left(= \frac{3\sqrt{3}}{2}p^2x^2\right)$ oe	
		P1	for process of finding area of *ABCDEF* eg $\frac{3\sqrt{3}}{2}x^2$ oe **AND** for process of finding area of *FGHIJK*, eg $p^2 \times \frac{3\sqrt{3}}{2}x^2$ oe	
		C1	correct algebra leading to given result, $\frac{3\sqrt{3}}{2}(p^2 - 1)x^2$	Accept $\frac{3\sqrt{3}}{2}x^2(p^2 - 1)$ as final result.

(**Q19 1MA1/3H, Nov 2020**)