2nd Year Christmas Test

Marking scheme

studyclix

Question 1

Marking scheme

Q11	Model Solution - 25 marks	Marking Notes
(a) & **(b)**	**(a)** $12 - 3(-2)^2$ $= 12 - 3(4)$ $= 0$	**Scale 10D (0, 4, 6, 8, 10)** Accept correct answer in **(a)** without work *Low Partial Credit:* • Work of merit in **(a) or (b)** for example: -2^2 in **(a)**, $p(m+3)$ in **(b)**

Question 2

Marking scheme

Question 3

Marking scheme

Q12	Model Solution – 35 Marks	Marking Notes
(a)	$(n-2)(n-9)$ **OR** $n^2 - 11n + 18$ $= n^2 - 9n - 2n + 18$ $= n(n-9) - 2(n-9)$ $= (n-9)(n-2)$ so $(n-2)(n-9)$ **OR**	**Scale 5C (0, 2, 3, 5)** Accept correct answer without work. *Low Partial Credit* • Work of merit, for example: $(n-2)$ or $(n-9)$, or any pair of factors of 18, or $n^2 - 9n - 2n + 18$. • Some correct substitution into the quadratic formula *High Partial Credit* • Factors which multiply to give 2 correct coefficients of the given expression, including the signs, for example: $(n+2)(n+9)$, or $(n-5)(n-6)$. • $n(n-9) - 2(n-9)$ • Solves $n^2 - 11n + 18 = 0$ (without factorising).
(b)	$y(w-1) + 1(w-1)$ $= (w-1)(y+1)$ or $(1-w)(-y-1)$ **OR** $w(y+1) - 1(y+1)$ $= (y+1)(w-1)$ or $(1-w)(-y-1)$	**Scale 5C (0, 2, 3, 5)** *Low Partial Credit* • Work of merit, for example: a common factor identified from given expression *High Partial Credit* • $w(y+1) - 1(y+1)$ • Correct answer without work
(c)	$\frac{5}{3(4)-2} - \frac{7}{6(4)-12}$ $= \frac{5}{10} - \frac{7}{12}$ $= -\frac{5}{60} = -\frac{1}{12}$ **or** $-0{\cdot}083\ldots$	**Scale 10B (0, 5, 10)** Accept correct answer without work *Partial Credit* • $3(4) - 2$ or $6(4) - 12$

Question 4

Marking scheme

(a) Multiply out and simplify $(x + 5)(x^2 - 2x + 6)$.

$$(x + 5)(x^2 - 2x + 6) = x^3 - 2x^2 + 6x + 5x^2 - 10x + 30$$

$$= x^3 + 3x^2 - 4x + 30.$$

OR

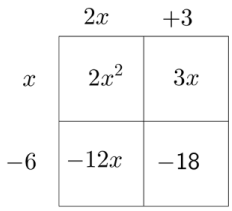
	x^2	$-2x$	$+6$
x	x^3	$-2x^2$	$+6x$
$+5$	$+5x^2$	$-10x$	$+30$

$$= x^3 + 3x^2 - 4x + 30$$

Question 5

Marking scheme

(b)(i)	$(5x)^2 - (7n)^2$ $= (5x + 7n)(5x - 7n)$ **OR** $(-5x - 7n)(7n - 5x)$	**Scale 10C (0, 3, 8, 10)** Accept correct answer without work. *Low Partial Credit* • Indicates or shows understanding of difference of 2 squares • $5x$ **or** $7n$ appears • 5 **and** 7 appear *High Partial Credit* • Correct, other than sign errors • $(5x)^2 - (7n)^2$ • $5x + 7n$ **or** $5x - 7n$

(b)(ii)	$(2x+3)(x-6)$ **OR** Guide Number = $2 \times (-18) = -36$ $2x^2 - 12x + 3x - 18$ = $2x(x-6) + 3(x-6)$ = $(2x+3)(x-6)$ **OR**  $(2x+3)(x-6)$	**Scale 5C (0, 2, 4, 5)** Accept correct answer without work. *No Credit* • ( ) ( ) *Low Partial Credit* • Some work of merit, e.g. factorises $2x^2$ or 18 or finds / factorises 36 • Any correct substitution into the quadratic formula *High Partial Credit* • $2x(x-6)+3(x-6)$ • $x(2x+3)-6(2x+3)$ • Answer given multiplies out to give two correct terms (including signs) • Solves correctly $2x^2 - 9x - 18 = 0$ $\left(\text{i.e. } x = 6 \text{ and } x = -\frac{3}{2}\right)$

Question 6

Marking scheme

(a) **10 marks** **Att 3**

I

$4 - x$	$2x - 5$
$4 + 5$	$2x + x$
9	$3x$
$9 \quad 3$	x
3	x

7m

II

$4 - x$	$2x - 5$
$-x - 2x$	$-5 - 4$
$-3x$	-9
$3x$	9
x	$9 \div 3$
x	3

7m

$x \leq 3 \rightarrow \{1,2,3\}$ **7m**

10m

Question 7

Marking scheme

Q8	Model Solution – 25 Marks	Marking Notes
(a)	$x = \frac{-(-4)\pm\sqrt{(-4)^2-4(1)(-7)}}{2(1)}$ $= \frac{4\pm\sqrt{16+28}}{2}$ $= \frac{4\pm\sqrt{44}}{2}$ $= 5\cdot316\ldots$ or $-1\cdot316\ldots$ $= 5\cdot32$ or $-1\cdot32$ [2 D.P.]	**Scale 15C (0, 4, 12, 15)** Note: If one root is given, award *HPC* at most Consider the solution as having 3 steps: Step 1: Correct formula Step 2: Full correct substitution into the quadratic formula. Step 3: Evaluates the quadratic formula. *Low Partial Credit* • 1 step correct • Identifies a, or b, or c • Correctly factorised and stops • 1 correct answer without work *High Partial Credit* • 2 steps correct • 2 correct answers without work *Full Credit –1* • Apply a * for incorrect rounding, or for answers in surd form: $2+\sqrt{11}$, $2-\sqrt{11}$

Question 8

Marking scheme

(c) (i) Solve the simultaneous equations:

$$2x - 3y = 18 \quad ①$$
$$5x + 9y = -10 \quad ②$$

① × 3: $6x - 9y = 54$

②: $5x + 9y = -10$

$11x = 44$

÷11: $x = 4$

Sub in $x = 4$ in ①:

$2(4) - 3y = 18$

$8 - 3y = 18$

$-3y = 18 - 8$

$-3y = 10$

×(–1): $3y = -10$

÷3: $y = -10 \div 3 = -10/3$ *or equivalent*

Answer: $x = 4$ and $y = -10/3$.

(ii) Verify your answer to **(c)(i)**.

*Note: Only need to check the equation that **wasn't** used to find the second variable. In this case, we only need use ②.*

$$5(4)+9\left(-\frac{10}{3}\right) \;=\; 20-30 \;=\; -10.$$

Question 9

Marking scheme

Q.10	Model Solution – 15 Marks	Marking Notes
(a)	$r = 4$ cm $C = 2\pi r$ $C = 2\pi(4)$ $= 8\pi$ $= 25 \cdot 1$ cm [1 D.P.]	**Scale 5C (0, 2, 3, 5)** Accept correct answer without work *Low Partial Credit* • Radius correct • Correct relevant formula *High Partial Credit* • Fully correct substitution into formula • Answer given as 8π • Finds area of the circle *Full Credit –1* • Apply a * for no rounding or incorrect rounding • Apply a * for no units or incorrect units
(b), (c)	(b) Length $= 6 \times$ diameter $+ C$ $= (6 \times 8) + 25 \cdot 1$ $= 48 + 25 \cdot 1$ $= 73 \cdot 1$ cm (c) Total distance $= 73 \cdot 1$ cm 1 turn $= 25 \cdot 1$ cm Number of turns $= \frac{73 \cdot 1}{25 \cdot 1} = 2 \cdot 9$ turns 2 full turns	**Scale 10D (0, 2, 4, 8, 10)** *Low Partial Credit* • Work of merit in one part, for example: adds some relevant measurements *Mid Partial Credit* • One part correct • Work of merit in both parts *High Partial Credit* • One part correct and work of merit in other part *Full Credit –1* • Apply a * for answer given as 2·9 or 3 turns • Apply a * for no units or incorrect units in (b)