Mark scheme   H   UNIT 9

This test is divided into non-calculator (30 minutes) and calculator (20 minutes) sections which can be delivered separately.

The following marks are awarded for each question.

B	Unconditional accuracy mark
M	Method mark – the correct method must be shown but there may be an arithmetic error; the sight of the value given in brackets implies the award of the method mark
A	Accuracy mark – unless the question specifies that working **must** be shown then the sight of the correct answer implies the award of full marks (unless the answer clearly comes from incorrect working)
C	Communication mark
P	Process mark to show correct process for problem solving. Any other process of a similar standard to achieve an accurate result is acceptable to achieve this mark
FT	Incorrect values may be **followed through** from one step to the next **provided** that the correct method is seen in each step and the only errors are arithmetic. This is shown in mark schemes by putting a number in inverted commas
OE	Or equivalent answer mark

Non-Calculator

Q	Answer	Mark	Comment
1	−2, −1, 0, 1	B2	B1 for −2, −1, 0, 1, 2 or any three correct with none incorrect, e.g. −1, 0, 1
3	3	M1	for $5x < 19 - 3$ OE; accept = or incorrect inequality symbol
		M1	for $x < (19 - 3) \div 5$ OE; accept = or incorrect inequality symbol, e.g. $x = \dfrac{16}{5}$
		A1	
5	$x = -2,\ y = 1.5$	M1	for method to eliminate one variable e.g. $(6x + 4y = -6) - (6x + 18y = 15)$ and $14y = 21$; allow one arithmetic error
		M1	for method to find the other variable e.g. $3x + 2("21 \div 14") = -3$; allow one arithmetic error
		A1	for $x = -2$ and $y = 1.5$ OE, e.g. $\dfrac{3}{2}$

7a	$(x =) 5$	M1	for $(x + 3)(x - 2) = 24$
		M1	(indep) for expansion of brackets e.g. $x^2 - 2x + 3x - 6$ (= 24); condone one error
		M1	for $(x \pm 6)(x \pm 5) = 0$ or any method to solve for x
		A1	accept $(x =) 5$ and $(x =) -6$
7b	8 (cm) and 3 (cm)	B1	FT from $x = 6$, i.e. 9 and 4
9a	$p = -3, \ q = -6$	M1	for $(x - 3)^2 - 9 + 3$; allow one error with -9 or $+3$ or missing -9 or $+3$
		A1	accept $(x - 3)^2 - 6$
9b	$(x =) 3 \pm \sqrt{6}$	M1	for "$(x + p)^2$ " $=$ "$-q$" e.g. $(x - 3)^2 = 6$
		M1	for "$(x + p)$" $= \sqrt{-q}$ e.g. $x - 3 = \sqrt{6}$
		A1	

🖩 **Calculator**			
11	$-\dfrac{9}{4} < x < \dfrac{14}{4}$	M1	for $-\dfrac{9}{4} < x$ OE or $x < \dfrac{14}{4}$ OE
		A1	for $-\dfrac{9}{4} < x < \dfrac{14}{4}$ OE
13	$(x =) 0.298$ and $(x =) -1.44$	M1	for $(x =) \dfrac{-8 \pm \sqrt{8^2 - 4(7)(-3)}}{2(7)}$ OE; allow one sign error
		M1	for simplification to $(x =) \dfrac{-8 \pm \sqrt{148}}{14}$
		A1	accept 0.297 to 0.298 and -1.44 to -1.441 with at least M1 scored; award no mark for answers only

Non-Calculator

Question	Topic	Step	Mark
1	Write down whole number values that satisfy an inequality	6th	2
3	Solve simple linear inequalities in one variable and represent the solution on a number line e.g. $3n + 2 < 11$ and $2n - 1 > 1$	7th	3
5	Solve two linear simultaneous equations algebraically, where neither or one equation needs multiplying	8th	3
7a	Rearrange and solve equations involving square root of $(x \pm b)$	8th	4
7b	Rearrange and solve equations involving square root of $(x \pm b)$	8th	1
9a	Solve quadratic equations of the form $x^2 + bx + c$ by completing the square	10th	2
9b	Solve quadratic equations of the form $ax^2 + bx + c$ by completing the square	12th	3

Calculator

Question	Topic	Step	Mark
11	Solve more complex linear inequalities in one variable and represent the solution on a number line e.g. $-6 <$	8th	2
13	Solve simple quadratic equations by using the quadratic formula	10th	3