

Mixed Algebra 3 ms

0 min
0 marks

1. $x^2 = w - y$. B1
Or equivalent $-x^2 = y - w$

$x = \sqrt{(w - y)}$ B1
Accept $\pm\sqrt{(w - y)}$ and $-\sqrt{(w - y)}$

[2]

2. $y \geq 0$ B1
Accept $y > 0$, or $0 \leq y \leq 3$,

$x \leq 6$ B1
Accept $x < 6$ or $0 \leq x \leq 6$,

$y \leq \frac{1}{2}x$ B1
Accept $y < \frac{1}{2}x$ or $x \geq 2y$ or equivalent.

$y = < \frac{1}{2}x$

Any order.

Special case: All three equations given (no inequalities) B1

Special case: All three inequalities the wrong way around B2.

[3]

3. (a) $x^2 + 8x + 16$ B2
*-1 eeo but must have 3 terms (in x^2 , x and constant). No negative totals.
Further work penalise by 1 mark.*

(b) Substituting their $(x + 4)^2$ for y^2 M1

Expanding to $x^2 + (x^2 + 8x + 16) = 36$ and dividing by 2. A1

substituting in formula (allow one error) M1

*Errors are wrong sign for $-b$ (+4), b^2 wrong (=8 or -16),
 $-4ac = -40$*

M0 for any of following:

Not dividing whole of top line by $2a$ (this error can be recovered).

Using wrong values for a , b and/or c

Forgetting square root.

Miscopying formula (e.g. omitting \pm)

(c) -5.74 A1

Do not give credit for T&I unless both answers seen. Put a pink slip on and send as script for special consideration.

1.74 A1

Do not award any marks for answer only. Some working must be seen.

Both answers given to a consistent but incorrect accuracy, give A1, A0.

Completing the square

$(x + 2)^2 - 14 = 0$ M1

$x = -2 \pm \sqrt{14}$ A1

$x = -5.74, 1.74$ A1 both answers

[7]

4. LHS $x(x - 1) - 2(x + 1)$ M1

Give M1 for $x^2 - 3x + 2$ if first line seen

Allow invisible bracket if recovered.

LHS = $x^2 - 3x - 2$ A1

Terms need not be collected. e.g. $x^2 - x - 2x - 2$

$(x - 1)(x + 1) (= x^2 - 1)$ M1

On RHS or as denominator.

$x^2 - 1$ can be written as $x^2 - x + x - 1$

Their $(x^2 - 3x - 2) = \text{their } (x^2 - 1)$ DM1
Dependent on first 2 M1's

$-\frac{1}{3}$ (= 0.33(3...)) A1

Do not follow through.

NB 'cancelling' x2 on top and bottom of

$$\frac{x^2 - 3x - 2}{x^2 - 1} = 1$$

Gives correct answer. Give M1, A1, M1. M0, A0.

[5]

5. $r - 3 = t\pi - 2\pi r$ M1

$r + 2\pi r = t\pi + 3$ A1

Or equivalent $-r - 2\pi r = -t\pi - 3$

$r(1 + 2\pi) = t\pi + 3$ DM1

This is for collecting factorising out r. Must have first M1 and something to factorise.

$r = (t\pi + 3)/(1 + 2\pi)$ A1f.t.

Must have r = on answer line, or give A0.

f.t. if both M1's awarded.

Accept equivalent answers.

e.g. $\frac{3}{\pi + t} \quad \frac{-3}{\pi - t} \quad \frac{-3}{-}$

$\frac{-\pi}{-}$

$2 + \frac{1}{\pi} \quad -2 - \frac{1}{\pi} \quad -$

$2\pi - 1$

[4]

6. $(5x \pm a)(x \pm b)$ M1

M1 for attempt to factorise. Must have $(5x \pm a)(x \pm b)$ where $ab = \pm 3$, a, b must be integers.

- $(5x - 1)(x + 3)$ A1
 $(x - 3)(x + 3)$ B1
 $(5x - 1)(x - 3)$ B1

Answer seen and further work then deduct last B1.

[4]

7. (a) (i) $(x - 8)(x + 1)$ B2
B1 $(x \pm 8)(x \pm 1)$

- (ii) 8 and -1 B1 ft

- (b) $15x + 9y = 39$ or $25x + 15y = 65$
and and
 $15x + 25y = 15$ $9x + 15y = 9$ M1

allow a total of 1 error in either 1st or 2nd M mark

- $16y = -24$ or $16x = 56$ M1

- $y = -1.5$ or $x = 3.5$ A1

- $x = 3.5$ and $y = -1.5$ A1

accept $y = -24/16$ and $x = 56/16$

SC1 correct answers with no working or using T & I

[7]

8. (a) $2x^2 - 5x - 3$ B2
B1 for $2x^2 - 6x + x - 3$ (any 3 out of 4 correct)

or $2x^2 \pm ?x - 3$ or $2x^2 - 5x \pm ?$

- (b) $(x - 8)(x + 1)$ B2

B1 for $(x \pm 8)(x \pm 1)$

[4]

9.	$15x + 9y = 39$ <u>and</u> $15x + 25y = 15$ $16y = -24$ $y = -1.5$ $x = 3.5$	<u>or</u> <u>and</u> <u>or</u> <u>or</u> <u>and</u>	$25x + 15y = 65$ $9x + 15y = 9$ $16x = 56$ $x = 3.5$ $y = -1.5$	M1 M1 A1 A1
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*Allow a total of 1 error in either 1st or 2nd M mark
accept $x = 56/16$ and $y = -24/16$
SC1 for correct ans. with no working or using T&I*

[4]

10.	Correct region indicated <i>Award marks dependent upon number of lines drawn correctly and extent of shading</i>	B3
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[3]