

Topic 15 Quadratics 1 (Pre-TT) [36] MARKSCHEME

- 1.
- | | | |
|---|----|--|
| $y(y + 5)$ | M1 | |
| 0 | A1 | |
| <i>Trial & improvement giving 0 or -5 only: SC1</i> | | |
| -5 | A1 | |
| <i>Trial & improvement giving 0 or -5 only: SC1</i> | | |
| [3] | | |
- 2.
- | | | |
|---|----|--|
| (a) $(p + a)(p + b)$ where $ab = 12$
<i>a and b must be positive</i> | M1 | |
| $(p + 3)(p + 4)$ | A1 | |
| (b) -3 and -4 | B1 | |
| <i>ft from answer to (a)</i> | | |
| [3] | | |
- 3.
- | | | |
|---|------------------------------------|--------------|
| (a) When $x = 2$, $2^3 + 20 \times 2 - 73 < 0$
When $x = 3$, $3^3 + 20 \times 3 - 73 > 0$ substitutes both 2 and 3 into equation
Since there is a sign change there is a root between 2 and 3 | | [M1]
[R1] |
| (b) Substitutes a value between 2 and 3 into $x^3 + 20x - 73$
Substitutes 2.6 to get < 0 and 2.7 to get > 0
Substitutes 2.65 to get < 0
Answer is $x = 2.7$ | [M1]
[M1]
[M1]*
[A1] dep* | |
- 4.
- | | | |
|--|----|--|
| $(y \pm a)(y \pm b)$ where $ab = 45$ | M1 | |
| $(y - 9)(y + 5)$ | A1 | |
| (+)9, -5 | A1 | |
| <i>ft on their brackets if M1 gained</i> | | |
| [3] | | |
- 5.
- | | | |
|--|--|--------------|
| (a) When $x = 4$, $4^3 + 2 \times 4 < 80$
When $x = 5$, $5^3 + 2 \times 5 > 80$ substitutes both 4 and 5 into equation
Since there is a sign change there is a root between 4 and 5 | | [M1]
[R1] |
| (b) Substitutes a value between 4 and 5 into $x^3 + 2x = 80$
Shows solution is between 4.1 and 4.2
Substitutes 4.15 to get < 0 and 4.16 to get > 0
Substitutes 4.155 to get > 0
Answer is $x = 4.15$ | [M1]
[M1] soi
[M1]
[M1]*
[A1] dep* | |
- 6.
- | | | |
|--|----|--|
| $2(x^2 - 25y^2)$ | B1 | |
| <i>for common factor of 2 correctly removed</i> | | |
| $2(x + 5y)(x - 5y)$ | B2 | |
| <i>B1 for each algebraic factor in its simplest form
(2x + 10y)(x - 5y) or (x + 5y)(2x - 10y) score B2</i> | | |
| [3] | | |

7.

(a) $x(x + 5) = 84$

B1

(b) $\frac{(x - 7)(x + 12)}{7}$

M1,A1
B1ft

*M1 for $(x+a)(x+b)$ where $ab = \pm 84$
A1 if correct
B1 for stating positive value*

[4]

8.

(Area =) $\frac{1}{2} x(x + 1 + x + 2)$

M1

oe $(x + 1) + \frac{1}{2} \times x \times (1)$

$2x^2 + 3x - 20 = 0$

A1

oe eg $x^2 + 1.5x - 10 = 0$

$(2x - 5)(x + 4) = 0$

M1dep

A1

M1 for an attempt at using an algebraic method such as factorising, formula (allow one error) or completing the square (allow one error) to solve the quadratic

eg for $(2x + a)(x + b)$ where $ab = \pm 20$

A1 for a completely correct method

$x = 2.5$

A1

Do not award last A1 if a negative value given as possible answer

eg if -4 given

2.5 seen with no or incomplete work SC2

2.5 after first M1, A1 give 5/5

[5]

9.

$(3x + a)(x + b)$ where $ab = 8$ or $a + 3b = 14$ or $3x(x + 4) + 2(x + 4)$ or $x(3x + 2) + 4(3x + 2)$	M1	
$(3x + 2)(x + 4)$	A1	oe