

Mark schemes

Q1.

$3x^2 - 6x + x - 2$
 or $3x^2 - 5x - 2$

4 terms with at least 3 correct

M1

$3x^2 + (a - \text{their } 5)x - \text{their } b^2 +$
 or $a - \text{their } 5 = 8$
 or $b - \text{their } 2 = -5$

M1

$a = 13$

A1

$b = -3$

A1

Additional Guidance

$a - \text{their } 5 = 8, a = 13$

M1A1

$a - \text{their } 5 = 8, a = 13$ and $b - 2 = -5, b = -3$

M1A1M1A1

$13x - 3$

M1A1M1A1

[4]

Q2.

$(x \Rightarrow) 2(x+1)$ or $2x + 1$

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

*oe May be seen as an index is $(32)x + 1$
 or $91/2x$*

M1

-2

*Correct answer is 2 marks even if working
 nonsense or wrong.*

A1

[2]

Q3.

(a) $12x^2 + 18x - 2x - 3$

*Must have four terms, one, ~~in~~ x^2 and a constant term. 3
 terms correct*

Terms may be in box method but must have correct signs

M1

$$12x^2 + 16x - 3$$

A1

Additional Guidance

$$8x^2 + 18x - 2x - 3$$

M1

$$12x^2 + 18x + 2x - 3$$

M1

$$8x^2 + 18x + 2x - 3$$

M0

$$12x^2 + 18x - 2x - 3$$

M0

	6x	-1
2x	12x ²	-2x
3	18x	-3

M1

	6x	-1
2x	12x ²	2x
3	18x	3

M1
(but can be recovered)

(b) Alternative method 1

$$(ax \pm c)(bx \pm d)$$

$$ab = 4 \text{ and } cd = \pm 3$$

M1

$$(4x - 3)(x + 1)$$

A1

$$\frac{3}{4} \text{ and } -1$$

ft their brackets if M1 awarded

A1ft

Alternative method 2

$$\frac{-1 \pm \sqrt{1^2 - 4 \times 4 \times -3}}{2 \times 4}$$

Allow one error from wrong sign for $-b$, wrong signs for $-4ac$, b^2 as -1

Do not accept wrong formula, ie $+$ not \pm , 2 not $2a$ or only

dividing root by 2a

M1

$$\frac{-1 \pm \sqrt{49}}{8}$$

A1

$$\frac{3}{4} \text{ and } -1$$

oe ft on wrong sign for $-b$ only eg $-\frac{3}{4}$ and -1

A1

Alternative method 3

$$\left(x + \frac{1}{8}\right)^2 = \frac{49}{64}$$

M1

$$x = \pm \sqrt{\frac{49}{64}} - \frac{1}{8}$$

A1

$$\frac{3}{4} \text{ and } -1$$

oe

A1ft

Alternative method 4

Writes $x^2 + x - 12$ and writes

$$\left(x \pm \frac{a}{4}\right) \left(x \pm \frac{b}{4}\right) \text{ where } ab = -12$$

$$(4x \pm 4)(4x \pm 3)$$

M1

$$\left(x + \frac{4}{4}\right) \left(x - \frac{3}{4}\right)$$

oe eg $(4x + 4)(4x - 3)$

A1

$$\frac{3}{4} \text{ and } -1$$

oe ft their brackets if M1 awarded

A1ft

Additional Guidance

$$(2x - 1)(2x + 3), \frac{1}{2} \text{ and } -1\frac{1}{2}$$

M1, A0, A1 ft

$$\frac{1 \pm \sqrt{1^2 - 4 \times 4 \times -3}}{2 \times 4}, -\frac{3}{4} \text{ and } 1$$

M1, A0, A1 ft

$$(4x + 3)(x - 1), -\frac{3}{4} \text{ and } -1$$

M1, A0, A1 ft

$$x^2 + x - 12$$

M1

$$\left(x + \frac{2}{4}\right)\left(x - \frac{6}{4}\right)$$

A0

$$1\frac{1}{2} \text{ and } -\frac{1}{2}$$

A1ft

[5]

Q4.

(a) $a(a - 3)$

*Do not accept fw
oe eg*

$$-a(-a + 3)$$

B1

(b) $3y + 18$

$$\frac{7y}{3} + \frac{4}{3} \text{ (Must be separate terms)}$$

B1

$$7y - 3y = 18 - 4$$

$$\text{or } 7y - \text{their } 3y = \text{their } 18 - 4$$

$$\text{or } 4y = 14$$

$$\frac{7y}{3} - y = 6 - \frac{4}{3}$$

$$\text{or their } \frac{7y}{3} - y = 6 - \text{their } \frac{4}{3}$$

M1

$$3.5 \text{ or } 3\frac{1}{2} \text{ or } \frac{7}{2}$$

ft collecting their four terms

A1ft

[4]

Q5.

(a) $5x - 15 - 3 + 3$

or $5x - 15 - 3 - - 3$

3 correct terms for M1 (can be seen separately)

NB $5x - 15 = \pm 3x \pm 3$ or allow M1 only, even if correct answer or ft answer subsequently seen

M1

$5x - 15 - 3x + 3$

Completely correct for A1

A1

$2x - 12$ or $2(x - 6)$

ft if M1 awarded and no further errors

Deduct a mark if incorrect further work

A1ft

(b) $8(x + 2) + 2(2 + 1)$ (with one denominator of 16 or no denominator)

If expanded straightaway 3 terms must be correct

$4(x + 2) + 2x + 1$ (with one denominator of 8 or no denominator)

If expanded straightaway 3 terms must be correct.

M1

$12x + 18$

$6x + 9$ or any multiple eg $24x + 36$

NB $12x + 18, 6x + 9$ etc. is M1, A1 as they often eliminate the denominators in two operations and leave incompatible denominators in their calculations

A1

Their $12x + 18 = 0$ (must be a linear equation)

Their $6x + 9 = 0$ (must be a linear equation)

M1Dep

-1.5

ft on both Ms and one error

A1ft

Alternative

$\frac{x}{2} + 1 + \frac{2x}{8} + \frac{1}{8}$

oe 3 correct fractions for M1

M1

$\frac{3x}{4} + 1\frac{1}{8}$

oe $\frac{3x}{4} + \frac{9}{8}$ or $0.75x + 1.125$

A1

Their $\frac{3x}{4} + 1\frac{1}{8} = 0$

M1

-1.5

ft on both Ms and one error

A1ft

[7]

Q6.

(a) -3 and 0

B1 for each

B2

(b) their 6 points plotted within tolerance

$\frac{1}{2}$ square tolerance

B1ft

Smooth curve through their points

Must be U shape through 6 points

B1ft

(c) -1.5 and 2

ft their graph

$\frac{1}{2}$ square tolerance

B1 for each

[-1.55, -1.45] and [1.95, 2.05]

B2ft

[6]

Q7.

(a) -4 and 5

B1 for each

B2

(b) 5 correctly plotted coordinates

*ft their -4 and their 5
tolerance $\pm\frac{1}{2}$ square*

M1

Smooth curve passing through their 5 points

*ft their plotted points
tolerance $\pm\frac{1}{2}$ square*

A1

(c) -1 and 2.5

B1 for each

B2

Additional Guidance

Do not accept coordinates

[6]