1) (i)
$$1 + 18x + 135x^{2}...$$

(ii) $(1 \times -5) + (18 \times -3) + (135 \times 1) = 76$
(ii) $(1 \times -5) + (18 \times -3) + (135 \times 1) = 76$
2) (a) (i) $1 - 21x + 189x^{2} - 945x^{3}$
(ii) $2 \times (189)$ and $5 \times (-945) = 341x^{3}$
(b) Identifies relevant $(x^{2})^{3} \left(\frac{2}{x}\right)^{6}$
Multiplies by 84
5376
3) $\left| (a + x) (1 - 2nx + ...) = 3 - 41x + bx^{2} - 945x^{3} + 1000 + 10$

| → 238 | | A1 | Co. |
|------------------------------|---------------|-------|-----------------------------|
| Coeff of x ² is 3 | × 84 – 1 × 14 | M1 | Must use sum of 2 products. |
| 1 – 2an = –41 | → n = 7 | M1 A1 | Must use 2 terms. |
| \rightarrow a = 3 | 3 | B1 | Co – anywhere |
| term in $x^3 = {}_nC_2$ | $(\pm 2x)^2$ | B1 | Wherever it comes. |

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| 5 [6] | $_{n}C_{2} = 28 \implies n(n-1) = 56 \implies n = 8 [or via n^{2} - n - 56 = (n-8)(n+7)]$ | M1 A1 | |
|-------|---|--------|--|
| | $np = -12 \implies p = -12/8 = -1.5$ | M1 A1√ | |
| | $q = {}_{8}C_{3}(-1.5)^{3} = -56 \times 27/8 = -189$ | M1 A1 | |

| 5) | Coefficient of x is $2^{5}\left(\frac{-x}{2}\right)6C1 = -96$ | M1 A1 | Unsimplified with 6C1. co. | | |
|---------|---|------------|---------------------------------|--|--|
| | Coefficient of x^2 is $2^4 \left(\frac{-x}{2}\right)^2$.6C2 = 60 | M1A1 | Unsimplified with 6C2. co. | | |
| | $(k+x)(60x^2-96x) \rightarrow 60k - 96 = 84$ | M1 | Must be considering 2 terms. | | |
| → k = 3 | | A1√ [6] | For his incorrect coefficients. | | |

7) (i)
$$2^5 + {}^5C_1 2^4 (-3x) + {}^5C_2 2^3 (-3x)^2$$

 $32 - 240x + 720x^2$

(i)
$$64-96x+60x^2-20x^3$$

(ii) Multiply by $1+2x+x^2$
 $-20+120-96=4$

8)

B1+B1+B1+B1 **M**1 A1 6