

Series 1 MS

Q1.

<p>2 $(1 - \frac{3}{2}x)^6$</p> <p>(i) Term in x^2 ${}^6C_2 \times \left(\frac{\pm 3x}{2}\right)^2 = \frac{135x^2}{4}$</p> <p>Term in x^3 ${}^6C_3 \times \left(\frac{\pm 3x}{2}\right)^3 = \frac{-540x^3}{8}$</p> <p>(ii) Term in $x^3 = \frac{270x^3}{4} - \frac{135kx^3}{2}$ $\rightarrow k = 1.$</p>	<p>M1 A1</p> <p>A1 [3]</p> <p>M1 A1 [2]</p>	<p>For either unsimplified term co</p> <p>co (omission or error with “-” can still gain 2 out of 3)</p> <p>considers exactly 2 terms in x^3</p> <p>co</p>
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Q2.

<p>1 $(a+x)^5 + (1-2x)^6$</p> <p>Coeff of x^3 in 1st = $10 \times a^2$</p> <p>Coeff of x^3 in 2nd = $20 \times (-2)^3$</p> <p>$\rightarrow 10a^2 - 160 = 90$</p> <p>$\rightarrow a = 5$</p>	<p>B1 B1 + B1 M1 A1 [5]</p>	<p>co co Forming an equation for a + solution co (condone \pm)</p>
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Q3.

<p>1</p>	<p>$6C4 \times [2(x)]^4 \times \left[\frac{1}{(x^2)}\right]^2$</p> <p>240</p>	<p>B2 B1 [3]</p>	<p>B1 for 2/3 terms correct</p> <p>Identified as answer. Allow $240x^0$</p>
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Q4.

<p>1</p>	<p>(i) $(2-y)^5 = 32 - 80y + 80y^2$</p> <p>(ii) $(2 - (2x - x^2))^5$ “y” = “$2x - x^2$” $\rightarrow 80 + 320 = 400$</p>	<p>B2,1 [2] M1 M1 A1 [3]</p>	<p>-1 for each error. Accept 2^5.</p> <p>Allow for $y = 2x + x^2$</p> <p>Needs to consider exactly 2 terms. CO – accept $400x^2$, accept full expansion if $400x^2$ is part of it.</p>
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Q5.

<p>1</p>	<p>$k^3 \times \left(\frac{1}{3}x\right)^2 \times 10$ (or correct factorials)</p> <p>$10 \times k^3 \times \frac{1}{9} = 30 \Rightarrow k = 3$</p>	<p>B2 B1 [3]</p>	<p>B1 for 2/3 terms correct</p> <p>cao</p>
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Q6.

<p>2 $[7C3] \times [(2x^3)^4] \times [(-1/x^2)^3]$ seen soi $35 \times 2^4 \times (-1)^3$ leading to their answer soi $-560(x^6)$ as answer</p>	<p>B1B1 B1 B1 [4]</p>	<p>2 elements correct, 3rd element correct 2 elements correct. Identifying reqd term SC B3 for $[560(x)^6]$ as answer</p>
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Q7.

<p>3 Coeff of x^3 in $(a+x)^5 = 10 \times a^2$ Coeff of x^3 in $(2-x)^6 = -160$ $\rightarrow 10a^2 - 160 = 90$ $\rightarrow a = 5$</p>	<p>B1 B1 B1 M1 A1 [5]</p>	<p>co co co forms an equation from 2 terms co</p>
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Q8.

<p>3 $(1-2x)^2(1+ax)^6$ Coeff of x in $(1+ax)^6 = 6ax$ Coeff of x^2 in $(1+ax)^6 = 15a^2x^2$ Multiplies by $(1-4x+4x^2)$ 2 terms in x $6a-4=-1$ $\rightarrow a = 1/2$ 3 terms in x^2 $15a^2-24a+4=b$ $\rightarrow b = -4 1/4$</p>	<p>B1 B1 M1 A1 M1 A1 [6]</p>	<p>6C1 needs removing (here or later) 6C2 needs removing (here or later) Needs to consider 2 terms in equation Co Needs to consider 3 terms in equation</p>
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Q9.

<p>4 (i) $(2x-x^2)^6 = 64x^6 - 192x^7 + 240x^8$ (ii) $\times (2+x)$ coeff of $x^8 = 2 \times 240 - 192$ 288</p>	<p>B1B1B1 [3] M1 A1[✓] [2]</p>	<p>cao Looks at exactly 2 terms</p>
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Q10.

<p>1 $\left(x^2 - \frac{a}{x}\right)^7$ Term in x^5 is ${}^7C_3 \times (x^2)^4 \times (-a/x)^3$ This term isolated Equated to $-280 \rightarrow a = 2$.</p>	<p>B1 M1 A1 [3]</p>	<p>Allow on own or in an expansion. Correct term in x^5 selected. Equated to -280</p>
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Q11.

1 $7C3 \times 2^4 \times \left(-\frac{x}{2}\right)^3$ powers 4 and 3 35 seen or implied -70	M1 B1 A1 [3]	
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Q12.

2 (i) $1 - 6px + 15p^2x^2$ (ii) $15p^2 \times 1 - 6p \times -1$ $3p(5p + 2) = 0$ $p = -\frac{2}{5}$ oe	B1B1 [2] M1 DM1 A1 [3]	Simplificn of nCr can be scored in (ii) Obtain & attempt to solve quadratic Allow $p = 0$ in addition
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