DIFFERENTIATION
THE RULE FOR POLYNOMIALS

A1 Differentiate $3x^3$	**A2** Differentiate ax^3	**A3** Differentiate $3x^a$	**A4** Differentiate ax^a
B1 Differentiate $5x^{2a}$	**B2** Differentiate ax^{2a}	**B3** Differentiate $5x^{a+1}$	**B4** Differentiate ax^{a+1}
C1 Differentiate $\dfrac{1}{4}x^4$	**C2** Differentiate $\dfrac{1}{a}x^3$	**C3** Differentiate $\dfrac{1}{5}x^a$	**C4** Differentiate $\dfrac{1}{a}x^a$
D1 Differentiate $\dfrac{1}{a}x^{a+1}$	**D2** Differentiate $\dfrac{1}{a+1}x^a$	**D3** Differentiate $\dfrac{1}{a+1}x^{a+1}$	**D4** Differentiate $\dfrac{3}{a}x^{3a}$
E1 Differentiate $7x^{2a+1}$	**E2** Differentiate $7x^{2(a+1)}$	**E3** Differentiate $2x^{3a-1}$	**E4** Differentiate $2x^{3(a-1)}$

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THE RULE FOR POLYNOMIALS

NO CALCULATOR

Ref: G911. **1E1**

A1 Differentiate	A2 Differentiate	A3 Differentiate	A4 Differentiate
$3x^3$ $\dfrac{dy}{dx} = 9x^2$	ax^3 $\dfrac{dy}{dx} = 3ax^2$	$3x^a$ $\dfrac{dy}{dx} = 3ax^{a-1}$	ax^a $\dfrac{dy}{dx} = a^2x^{a-1}$
B1 Differentiate	**B2** Differentiate	**B3** Differentiate	**B4** Differentiate
$5x^{2a}$ $\dfrac{dy}{dx} = 10ax^{2a-1}$	ax^{2a} $\dfrac{dy}{dx} = 2a^2x^{2a-1}$	$5x^{a+1}$ $\dfrac{dy}{dx} = 5(a+1)x^a$	ax^{a+1} $\dfrac{dy}{dx} = a(a+1)x^a$
C1 Differentiate	**C2** Differentiate	**C3** Differentiate	**C4** Differentiate
$\dfrac{1}{4}x^4$ $\dfrac{dy}{dx} = x^3$	$\dfrac{1}{a}x^3$ $\dfrac{dy}{dx} = \dfrac{3}{a}x^2$	$\dfrac{1}{5}x^a$ $\dfrac{dy}{dx} = \dfrac{a}{5}x^{a-1}$	$\dfrac{1}{a}x^a$ $\dfrac{dy}{dx} = x^{a-1}$
D1 Differentiate	**D2** Differentiate	**D3** Differentiate	**D4** Differentiate
$\dfrac{1}{a}x^{a+1}$ $\dfrac{dy}{dx} = \dfrac{a+1}{a}x^a$	$\dfrac{1}{a+1}x^a$ $\dfrac{dy}{dx} = \dfrac{a}{a+1}x^{a-1}$	$\dfrac{1}{a+1}x^{a+1}$ $\dfrac{dy}{dx} = x^a$	$\dfrac{3}{a}x^{3a}$ $\dfrac{dy}{dx} = 9x^{3a-1}$
E1 Differentiate	**E2** Differentiate	**E3** Differentiate	**E4** Differentiate
$7x^{2a+1}$ $\dfrac{dy}{dx} = 7(2a+1)x^{2a}$	$7x^{2(a+1)}$ $\dfrac{dy}{dx} = 14(2a+1)x^{2a+1}$	$2x^{3a-1}$ $\dfrac{dy}{dx} = 2(3a-1)x^{3a-2}$	$2x^{3(a-1)}$ $\dfrac{dy}{dx} = 6(a-1)x^{3a-4}$