Differentiating Polynomials

Starter

1. Without a calculator find: (a) $\frac{7}{2} - 1$ (b) $\frac{11}{3} - 1$ (c) $\frac{3}{7} - 1$

(d) $\frac{4}{9} - 1$ (e) $-\frac{8}{11} - 1$ (f) $-\frac{15}{4} - 1$

Working: (a) $\frac{5}{2}$ (b) $\frac{8}{3}$ (c) $-\frac{4}{7}$

(d) $-\frac{5}{9}$ (e) $-\frac{19}{11}$ (f) $-\frac{19}{4}$

E.g. 1 Find the first derivative of these functions:

(a) $y = x^5$ (b) $f(x) = 7x^4$ (c) $y = x^{-7}$ (d) $f(x) = -5x^{-4}$

(e) $y = x^{\frac{3}{2}}$ (f) $f(x) = x^{\frac{1}{4}}$ (g) $y = x^{-\frac{4}{3}}$ (h) $f(x) = 12x^{-\frac{1}{6}}$

Working:

(a) $\frac{dy}{dx} = 5x^{5-1} = 5x^4$

(b) $f'(x) = 7 \times 4x^{4-1} = 28x^3$

(c) $\frac{dy}{dx} = -7x^{-7-1} = -7x^{-8}$

(d) $f'(x) = (-5) \times (-4)x^{-4-1} = 20x^{-5}$

(e) $\frac{dy}{dx} = \frac{3}{2}x^{\frac{3}{2}-1} = \frac{3}{2}x^{\frac{1}{2}}$

(f) $f'(x) = \frac{1}{4}x^{\frac{1}{4}-1} = \frac{1}{4}x^{-\frac{3}{4}}$

(g) $\frac{dy}{dx} = -\frac{4}{3}x^{-\frac{4}{3}-1} = -\frac{4}{3}x^{-\frac{7}{3}}$

(h) $f'(x) = 12 \times \left(-\frac{1}{6}\right)x^{-\frac{1}{6}-1} = -2x^{-\frac{7}{6}}$

N.B. In your working you can miss out the middle step and go straight to the answer.

Video: Differentiating polynomials
Video: Differentiating polynomials EQ

Solutions to Starter and E.g.s

Exercise
p257 13C Qu 1i, 2i, 3i, 4-6