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Binomial Expansion

| Past Paper Question | C2 OCR June 2012 Q1

- (i) Find the binomial expansion of $(3 + 2x)^5$, simplifying the terms. [4]
(ii) Hence find the binomial expansion of $(3 + 2x)^5 + (3 - 2x)^5$. [2]

$$(a+b)^n \equiv \binom{n}{0}a^n b^0 + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \dots + \binom{n}{n}a^0 b^n$$



$$(i) \quad (3+2x)^5 \equiv \binom{5}{0}(3)^5(2x)^0 + \binom{5}{1}(3)^4(2x)^1 + \binom{5}{2}(3)^3(2x)^2 + \binom{5}{3}(3)^2(2x)^3 \\ + \binom{5}{4}(3)^1(2x)^4 + \binom{5}{5}(3)^0(2x)^5$$

$$\equiv 243 + 810x + 1080x^2 + 720x^3 + 240x^4 + 32x^5$$

$$(ii) \quad (3+2x)^5 + (3-2x)^5 \equiv 243 + 810x + 1080x^2 + 720x^3 + 240x^4 + 32x^5 \\ + 243 - 810x + 1080x^2 - 720x^3 + 240x^4 - 32x^5 \\ \equiv 486 + 2160x^2 + 480x^4$$

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