Additional Math with Ali Hashir

The Binomial Theorem

Worksheet 1 — Answers

Q1. (a) $1 + 12x + 54x^2 + 108x^3 + 81x^4$. (b) $1 - 14x + 84x^2 - 280x^3$.

Q2. $1 + 5x + \frac{45}{4}x^2$; $(1.005)^{10} \approx 1.0511$.

Q3. (a) $57344x^5$. (b) $59136x^6$. (c) $2835x^8$.

Q4. Coefficient of x^6 is -7; coefficient of x^{10} is $-\frac{7}{4}$. Every term has the form $\binom{8}{r}\left(-\frac{x^2}{2}\right)^r$, so only even powers of x occur – there can be no term in x^7.

Q5. $k = 42$.

Q6. $2 + 1224x^2 + 97920x^4$; $(1.02)^{18} + (0.98)^{18} \approx 2.12$.

Q7. (a) $44 : 1$. (b) -9120.

Q8. $n = 5$, $a = 3$; coefficient of x^3 is 270.

Q9. $a = \frac{1}{3}$, $b = -\frac{7}{3}$.

Q10. Shown (see solutions). (a) $1 + 11x + 26x^2$. (b) $1 - 11x^2$.

Challenge 1. Shown (see solutions): the expression is the expansion of $\left[(1-2x)+2x\right]^5 = 1^5 = 1$.

Challenge 2. Shown (see solutions). Remainder $= 3$.

Full worked solutions available separately.

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