Test 2

Maths AA IB$_1$ — *Binomial coefficients & Polynomial expansion* — Wednesday 30.10.2024

Total : / 36 — Name:_____

Problem 1 *[6 marks]*

Give the exact value of $\sum_{x=1}^{7} (4-x)$

Problem 2 *[7 marks]*

Find the term in x^{11} in the expansion of $\left(2x^3 - \frac{3}{x}\right)^5$

Problem 3 *[8 marks]*

Find the coefficient of x^6 is the expansion of $\left(\frac{1}{x}\right)^4 \left(2x^2 - \frac{1}{4x}\right)^8$

Problem 4 *[7 marks]*

Find the coefficient of x^2 is the expansion of $\left(\sqrt{x} - \frac{1}{x}\right)^7$

Problem 5 *[8 marks]*

Consider the binomial expansion $(x-2)^6 = x^6 + ax^5 + bx^4 + cx^3 + dx^2 + \cdots$

(a) Show that $\frac{d}{b} = 4$

(b) Find x such that $x^6 = \frac{ax^5 + bx^4}{9}$

Bonus *[+2]*

calculate $\sqrt{\frac{\binom{12}{8}}{\binom{9}{3}} - \binom{2}{1}}$