

Advanced Algebra

Unit 7 Binomial Expansion HW Assignment #7

1) Given  $(x+5)(x^2+2)^{10}$ , find the coefficient of  $x^5$

$$(x^2)^{10} + (x^2)^9 \cdot 2 + (x^2)^8 \cdot 2^2$$

$$2 \cdot {}_{10}C_8 (x^2)^2 \cdot 2^8$$

Final answer

$${}_{10}C_8 \cdot 2^8$$

2) Given  $(2x+3)(x^2+8)^{12}$ , find the coefficient of  $x^{13}$

$$(x^2)^{12} + (x^2)^{11} \cdot 8 + (x^2)^{10} \cdot 8^2$$

$$2 \cdot {}_{12}C_4 (x^2)^6 \cdot 8^4$$

Final answer

$$2 \cdot {}_{12}C_4 \cdot 8^4$$

3) Given  $(x+8)(3x^3+4)^8$ , find the coefficient of  $x^{25}$

$$(3x^3)^8$$

Final answer

$$3^8$$

4) Given  $(x^2 + \frac{5}{x^3})^{14}$

Find the coefficient of  $x^8$

$$(x^2)^{14} + \frac{(x^2)^{13}}{x^3} + \frac{(x^2)^{12}}{x^6} + \frac{(x^2)^{11}}{9} + \frac{(x^2)^{10}}{x^{12}}$$

$${}_{14}C_4 (x^2)^{10} \left(\frac{5}{x^3}\right)^4$$

Find the constant term

Final answer here:

$${}_{14}C_4 \cdot 5^4$$

Final answer here:

5) Given  $(x^3 + \frac{8}{x^2})^{10}$

Find the coefficient of  $x^5$

$$(x^3)^{10} + (x^3)^9 \frac{8}{x^2} + \frac{(x^3)^8}{x^4} + \frac{(x^3)^7}{x^6} + \frac{(x^3)^6}{x^8} + \frac{(x^3)^5}{x^{10}}$$

$${}_{10}C_5 (x^3)^5 \left(\frac{8}{x^2}\right)^5$$

Find the constant term

Final answer here:

$${}_{10}C_5 \cdot 8^5$$

Final answer here:

6) Given  $(x^5 + \frac{7}{x^2})^8$

Find the coefficient of  $x^{12}$

$$(x^5)^8 + \frac{(x^5)^7}{x^2} + \frac{(x^5)^6}{x^4} + \frac{(x^5)^5}{x^6} + \frac{(x^5)^4}{x^8}$$

$$(x^5)^4 \left(\frac{7}{x^2}\right)^4$$

Find the constant term

Final answer here:

$${}_{8}C_4 \cdot 7^4$$

Final answer here: