

Name: _____

Show work needed to justify your answer.

Date: _____

HW: # 21a: Math IBSL - Standard 21 - The Binomial Theorem

5 points

1 Find the indicated term for the expansions below:

$${}_n C_r (a)^{n-r} (b)^r$$

a The fifth term of $(3x - 5)^{11}$

$$n = 11$$

$$r = 5 - 1 = 4$$

$${}_{11} C_4 (3x)^7 (-5)^4$$

$$(330)(2187x^7)(625)$$

$$\boxed{451068750x^7}$$

b The ninth term of $(x + 6y)^{10}$

$$n = 10$$

$$r = 9 - 1 = 8$$

$${}_{10} C_8 (x)^2 (6y)^8$$

$$45(x^2)(1679616y^8)$$

$$\boxed{75582720x^2y^8}$$

3 a Find the term in x^3 in the expansion of $(x - 3)^8$.

b Find the term in x^5 in the expansion of $-2x(x - 3)^8$.

$$(a) {}_8 C_5 (x)^3 (-3)^5$$

$$(56)(x^3)(-243) \rightarrow \boxed{-13608x^3}$$

$$n = 8$$

$$r = 5$$

$$n - r = 3 \checkmark$$

$$(b) {}_8 C_4 (x)^4 (-3)^4$$

$$(70)(x^4)(81)$$

$$(-2x)(5670x^4)$$

$$\boxed{-11340x^5}$$

$$n = 8$$

$$r = 4$$

$$n - r = 4$$

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6 The fourth term in the expansion of $(2x - k)^8$ is $-387072x^5$. Find the value of k .

$$n=8$$

$$r=3$$

$$8C_3 (2x)^5 (-k)^3 = -387072x^5$$

$$56(32x^5)(-k^3) = -387072x^5$$

$$-1792k^3 = -387072$$

$$216 = k^3$$

$$k = 6$$

7 In the expansion of $(a - b^2)^6$, what is the coefficient of the term in a^3b^6 ?

$$n=6$$

$$r=3$$

$$6C_3 (a)^3 (-b^2)^3$$

$$20 a^3 (-b^6)$$

$$-20 a^3 b^6$$

$$\boxed{-20}$$

11 Find the binomial power, in the form $(a + b)^n$, with expansion $27x^3 - 108x^2y + 144xy^2 - 64y^3$.

$$a^3 = 27x^3$$

$$a = 3x$$

$$b^3 = -64y^3$$

$$b = -4y$$

$$\boxed{(3x - 4y)^3}$$