

Advanced Algebra Binomial Expansion

Binomial Assignment #4

Name: _____

Hr: _____

ONE: Simplify each of the expressions below

<p>a. $3x \cdot 4x^2$</p> $12x^3$	<p>b. $(3x)^2 \cdot (4x^2)^3$</p> $576x^8$	<p>c. $10x(2x^5)^2$</p> $10x \cdot 4x^{10}$ $40x^{11}$	<p>d. $(5\sqrt{x})^2 \cdot (\sqrt{x})^3$</p> $25x^1 \cdot x^{\frac{3}{2}}$ $25x^{\frac{5}{2}}$ $25x^{2.5}$
--	---	---	---

TWO:

Simplify each of the expressions below

<p>a. $x \cdot \frac{1}{x}$</p> 1	<p>b. $10x \cdot \frac{2}{x}$</p> 20	<p>c. $2x^5 \cdot \left(\frac{1}{x}\right)^3$</p> $2x^2$	<p>d. $2x^3 \cdot \left(\frac{1}{x}\right)^5$</p> $\frac{2}{x^2}$
--	---	---	--

THREE: Use the formula $(a + b)^8 = a^8 + 8a^7b^1 + 28a^6b^2 + 56a^5b^3 + 70a^4b^4 + 56a^3b^5 + 28a^2b^6 + 8a^1b^7 + b^8$

Expand and simplify $(2x + 3)^8$

$$(2x)^8 + 8(2x)^7 \cdot 3 + 28(2x)^6 \cdot 3^2 + 56(2x)^5 \cdot 3^3 + 70(2x)^4 \cdot 3^4 + 56(2x)^3 \cdot 3^5 + 28(2x)^2 \cdot 3^6 + 8(2x) \cdot 3^7 + 3^8$$

$$256x^8 + 3072x^7 + 16128x^6 + 48384x^5 + 90720x^4 + 108864x^3 + 81648x^2 + 34992x + 6561$$

FOUR:

a. Expand and simplify the first 4 terms of $(a + b)^7$

$$a^7 + 7a^6b + 16a^5b^2 + 25a^4b^3 + 35a^3b^4$$

b. Expand and simplify the first 4 terms of $(a + b)^{12}$

$$a^{12} + \binom{12}{1} a^{11}b + \binom{12}{2} a^{10}b^2 + \binom{12}{3} a^9b^3 + \binom{12}{4} a^8b^4$$

$$\boxed{a^{12} + 12a^{11}b + 66a^{10}b^2 + 220a^9b^3 + 495a^8b^4}$$

c. Expand and simplify the first 4 terms of $(a + b)^{18}$

$n=0$ 1
 $n=1$ 1 1
 $n=2$ 1 2 1
 $n=3$ 1 3 3 1
 $n=4$ 1 4 6 4 1
 $n=5$ 1 5 10 10 5 1
 $n=6$ 1 6 15 20 15 6 1
 $n=7$ 1 7 21 35 35 21 7 1

FIVE: Use the formula $(a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5a^1b^4 + b^5$

For each part circle the term in your final answer that is the x^2 term.

a. Expand and simplify $(x^2 + 1)^5$

$$(x^2)^5 + \binom{5}{1} (x^2)^4 \cdot 1 + \binom{5}{2} (x^2)^3 \cdot 1^2 + \binom{5}{3} (x^2)^2 \cdot 1^3 + \binom{5}{4} x^2 \cdot 1^4 + 1^5$$

b. Expand and simplify $(\sqrt{x} + 1)^5$

$$(x^{\frac{1}{2}})^5 + \binom{5}{1} (x^{\frac{1}{2}})^4 \cdot 1 + \binom{5}{2} (x^{\frac{1}{2}})^3 \cdot 1^2 + \binom{5}{3} (x^{\frac{1}{2}})^2 \cdot 1^3 + \binom{5}{4} (x^{\frac{1}{2}}) \cdot 1^4 + 1^5$$

c. Expand and simplify $(x + \frac{1}{x})^5$

$$x^5 + \binom{5}{1} x^4 \left(\frac{1}{x}\right) + \binom{5}{2} x^3 \left(\frac{1}{x}\right)^2 + \binom{5}{3} x^2 \left(\frac{1}{x}\right)^3 + \binom{5}{4} x \left(\frac{1}{x}\right)^4 + \left(\frac{1}{x}\right)^5$$