DATE: ________________

Rally Coach: Binomial Theorem (Target 7A)

Find the coefficient of the x^2 term in the expansion of $(\underbrace{2}_{a}+\underbrace{x}_{b})^{5}$

$$\binom{5}{2}(2)^3(x)^2$$
$$=10\cdot 8x^2$$
$$=80x^2$$
$$\boxed{80}$$

Find the coefficient of the a^2 term in the expansion of $(2a+1)^5$

$$\binom{5}{3}(2a)^2(1)^3$$
$$=10\cdot 4a^2$$
$$=40a^2$$
$$\boxed{40}$$

Find the coefficient of the a^3b^4 term in the expansion of $(a-3b)^7$

$$\binom{7}{4}a^3(-3b)^4$$
$$=35a^3\cdot 81b^4$$
$$=2835a^3b^4$$
$$\boxed{2835}$$

Find the coefficient of the x^3y^4 term in the expansion of $(2x-y)^7$

$$\binom{7}{4}(2x)^3(-y)^4$$
$$=35\cdot 8x^3\cdot y^4$$
$$=280x^3y^4$$
$$\boxed{280}$$

Find the 2^{nd} term in the expansion of $(y-2x)^4$

$r=2$
$r-1=1$

$$\binom{4}{1}(y)^3(-2x)^1$$
$$=4\cdot y^3\cdot -2x$$
$$=\boxed{-8xy^3}$$

Find the 2^{nd} term in the expansion of $(y-x)^4$

$r=2$
$r-1=1$

$$\binom{4}{1}(y)^3(-x)^1$$
$$=4\cdot y^3\cdot -x$$
$$=\boxed{-4xy^3}$$

Find the 10^{th} term in the expansion of $(x+y)^{23}$

$r=10$
$r-1=9$

$$\binom{23}{9}x^{14}y^9$$
$$=\boxed{817190x^{14}y^9}$$

Find the 10^{th} term in the expansion of $(a+b)^{18}$

$r=10$
$r-1=9$

$$\binom{18}{9}a^9b^9$$
$$=\boxed{48620a^9b^9}$$

Find the 11th term in the expansion of: $(2x+y)^{13}$ $r=11,\ r-1=10$

$$\binom{13}{10}(2x)^3y^{10}$$

$$=286\cdot 8x^3y^{10}$$

$$=\boxed{2288x^3y^{10}}$$

Find the 11th term in the expansion of: $(x+2y)^{13}$ $r=11,\ r-1=10$

$$\binom{13}{10}x^3(2y)^{10}$$

$$=286x^3\cdot 1024y^{10}$$

$$=\boxed{292864x^3y^{10}}$$

Expand the binomial: $(2x-3y)^5$

$$\binom{5}{0}(2x)^5(-3y)^0+\binom{5}{1}(2x)^4(-3y)^1+\binom{5}{2}(2x)^3(-3y)^2+\binom{5}{3}(2x)^2(-3y)^3+\binom{5}{4}(2x)^1(-3y)^4+\binom{5}{5}(2x)^0(-3y)^5$$

$$=\boxed{32x^5-240x^4y+720x^3y^2-1080x^2y^3+810xy^4-243y^5}$$

Expand the binomial: $(3x-4y)^5$

$$\binom{5}{0}(3x)^5(-4y)^0+\binom{5}{1}(3x)^4(-4y)^1+\binom{5}{2}(3x)^3(-4y)^2+\binom{5}{3}(3x)^2(-4y)^3+\binom{5}{4}(3x)^1(-4y)^4+\binom{5}{5}(3x)^0(-4y)^5$$

$$=\boxed{243x^5-1620x^4y+4320x^3y^2-5760x^2y^3+3840xy^4-1024y^5}$$

Expand the binomial: $(x^4-y)^3$

$$\binom{3}{0}(x^4)^3(-y)^0+\binom{3}{1}(x^4)^2(-y)^1+\binom{3}{2}(x^4)^1(-y)^2+\binom{3}{3}(x^4)^0(-y)^3$$

$$=\boxed{x^{12}-3x^8y+3x^4y^2-y^3}$$

Expand the binomial: $(x-y^4)^3$

$$\binom{3}{0}(x)^3(-y^4)^0+\binom{3}{1}(x)^2(-y^4)^1+\binom{3}{2}(x)^1(-y^4)^2+\binom{3}{3}(x)^0(-y^4)^3$$

$$=\boxed{x^3-3x^2y^4+3xy^8-y^{12}}$$

Find the 8th term in the expansion of: $(a^2b-cd^3)^{15}$ $r=8$, $r-1=7$

$$\binom{15}{7}(a^2b)^8(-cd^3)^7$$

$$=\boxed{-6435a^{16}b^8c^7d^{21}}$$

Find the 8th term in the expansion of: $(a^3b-cd^2)^{15}$ $r=8$, $r-1=7$

$$\binom{15}{7}(a^3b)^8(-cd^2)^7$$

$$=\boxed{-6435a^{24}b^8c^7d^{14}}$$

Expand the binomial: $(\sqrt{x}+\sqrt{3})^3$

$$\binom{3}{0}(\sqrt{x})^3(\sqrt{3})^0+\binom{3}{1}(\sqrt{x})^2(\sqrt{3})^1+\binom{3}{2}(\sqrt{x})^1(\sqrt{3})^2+\binom{3}{3}(\sqrt{x})^0(\sqrt{3})^3$$

$$=\sqrt{x^3}+3\sqrt{3}\,x+9\sqrt{x}+\sqrt{27}$$

$$=\boxed{x\sqrt{x}+3\sqrt{3}\,x+9\sqrt{x}+3\sqrt{3}}$$

Expand the binomial: $(\sqrt{x}+\sqrt{2})^3$

$$\binom{3}{0}(\sqrt{x})^3(\sqrt{2})^0+\binom{3}{1}(\sqrt{x})^2(\sqrt{2})^1+\binom{3}{2}(\sqrt{x})^1(\sqrt{2})^2+\binom{3}{3}(\sqrt{x})^0(\sqrt{2})^3$$

$$=\sqrt{x^3}+3\sqrt{2}\,x+6\sqrt{x}+\sqrt{8}$$

$$=\boxed{x\sqrt{x}+3\sqrt{2}\,x+6\sqrt{x}+2\sqrt{2}}$$