Practice 14.3

Evaluate each combination. Use the formula and then check your answers with your calculator.
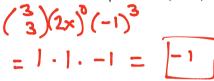
1. $_{11}C_5 = 462$

$= \dfrac{11!}{5!\,6!} = \dfrac{11 \cdot \cancel{10} \cdot \cancel{9} \cdot \cancel{8} \cdot 7 \cdot \cancel{6}}{\cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2}} \dfrac{1}{6!} = 11 \cdot 2 \cdot 3 \cdot 7$

Find each term described.

2. $_{13}C_8 = 1287$

$\dfrac{13 \cdot \cancel{12} \cdot 11 \cdot \cancel{10} \cdot 9 \cdot \cancel{8}!}{5 \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{8}!} = 13 \cdot 11 \cdot 9 = 1287$

3. $_{10}C_6 = 210$

$\dfrac{10^{3} \cdot \cancel{9} \cdot \cancel{8} \cdot 7 \cdot \cancel{6}!}{\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{6}!} = 10 \cdot 3 \cdot 7$

4. $_{10}C_4 = 210$

SAME AS #3

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5) 4th term in expansion of $(2x - 1)^3$

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

$= 1 \cdot 1 \cdot -1 = \boxed{-1}$

6) 1st term in expansion of $(4x - 2y)^4$

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

$256x^4$

$\boxed{= 256x^4}$

7) 3rd term in expansion of $(y + 3)^4$

$\binom{4}{2}(y)^2(3)^2$

$6y^2 \cdot 9$

$\boxed{= 54y^2}$

8) 2nd term in expansion of $(2u + v)^4$

$\binom{4}{1}(2u)^3(v)^1$

$4 \cdot 8u^3 \cdot v$

$\boxed{= 32u^3v}$

9) 5th term in expansion of $(x + 2y)^4$

$\binom{4}{4}(x)^0(2y)^4$

$1 \cdot 1 \cdot 16y^4$

$\boxed{= 16y^4}$

10) 3rd term in expansion of $(y - 5x)^3$

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

$3 \cdot 1 \cdot -125x^3$

$3 \cdot -125x^3 \cdot y$

$\boxed{-375x^3y}$

Expand completely.

11) $(2n - 1)^3$

$\begin{array}{c}1\\1\ \ 1\\1\ \ 2\ \ 1\\1\ \ 3\ \ 3\ \ 1\\1\ \ 4\ \ 6\ \ 4\ \ 1\\1\ \ 5\ \ 10\ \ 10\ \ 5\ \ 1\end{array}$

$1(2n)^3(-1)^0 + 3(2n)^2(-1)^1 + 3(2n)^1(-1)^2 + 1(2n)^0(-1)^3$

$\boxed{= 8n^3 - 12n^2 + 6n - 1}$

12) $(1 + 3y)^3$

$1(1)^3(3y)^0 + 3(1)^2(3y)^1 + 3(1)^1(3y)^2 + 1(1)^0(3y)^3$

$= 1 + 9y + 27y^2 + 27y^3$

13) $(x - 4y)^4$

$1x^4(-4y)^0 + 4x^3(-4y)^1 + 6x^2(-4y)^2 + 4x(-4y)^3 + 1x^0(-4y)^4$

$x^4 - 16x^3y + 96x^2y^2 - 256xy^3 + 256y^4$

14) $(x + 4)^4$

$1x^4(4)^0 + 4x^3(4)^1 + 6x^2(4)^2 + 4x(4)^3 + 1x^0(4)^4$

$= x^4 + 16x^3 + 96x^2 + 256x + 256$

15) $(y - 3x)^5$

$1y^5(-3x)^0 + 5y^4(-3x)^1 + 10y^3(-3x)^2 + 10y^2(-3x)^3 + 5y(-3x)^4 + y^0(-3x)^5$

$= y^5 - 15y^4x + 90y^3x^2 - 270y^2x^3 + 405yx^4 - 243x^5$