Answer on Question #71748 – Math – Algebra

Question

Use Pascal's Triangle to expand each expressions: (x-2y)^4

Solution

The first six rows of Pascal's triangle is

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

To expand $(x - 2y)^4$ we select the coefficients from the fifth row of the triangle, that is

$$1 \quad 4 \quad 6 \quad 4 \quad 1$$

Write down the expansion, considering that for each next term we decrease the power of x, starting with 4 and increasing the power of $(-2y)$. So

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

Performing exponentiation we get

$$(x - 2y)^4 = x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4$$

Answer:

$$(x - 2y)^4 = x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4$$