PAP Algebra 2

Multiplying Polynomials

multiplying polynomials

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57, 13, 55, 58

$P(x) = \frac{1}{2}x^3 - x^2 + 8 \quad x = -2$

$P(-2) = \frac{1}{2}(-2)^3 - (-2)^2 + 8$

$= \frac{1}{2}(-8) - 4 + 8$

$= -4 - 4 + 8$

$= 0$

Find each product.

$5x^2y(2x^2 + xy - y^2)$

$10x^4y + 5x^3y^2 - 5x^2y^3$

$(x-3)(x^2 - 4x + 2)$

$x^3 - 4x^2 + 2x - 3x^2 + 12x - 6$

$x^3 - 7x^2 + 14x - 6$

$(y^2 - 7y + 5)(y^2 - y - 3)$

$y^4 - y^3 - 3y^3 - 7y^3 + 7y^2 + 21y + 5y^2 - 5y - 15$

$y^4 - 8y^3 + 9y^2 + 16y - 15$

examples

Find each product.

$(x+2)^3$

$(x+2)(x+2)(x+2)$

$x^2 + 2x + 2x + 4$

$(x^2 + 4x + 4)(x+2)$

$x^3 + 2x^2 + 4x^2 + 8x + 4x + 8$

$x^3 + 6x^2 + 12x + 8$

examples

Expanding a Power of a Binomial

Binomial Expansion		Pascal's Triangle (coefficients)
$(a+b)^0 =$	1	1
$(a+b)^1 =$	$a+b$	1 1
$(a+b)^2 =$	$a^2+2ab+b^2$	1 2 1
$(a+b)^3 =$	$a^3+3a^2b+3ab^2+b^3$	1 3 3 1
$(a+b)^4 =$	$a^4+4a^3b+6a^2b^2+4ab^3+b^4$	1 4 6 4 1
$(a+b)^5 =$	$a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+b^5$	1 5 10 10 5 1

Binomial Expansion

For a binomial expansion of the form $(a+b)^n$, the following statements are true.

1. There are $n+1$ terms.
2. The coefficients are the numbers from the nth row of Pascal's triangle.
3. The exponent of a is n in the first term, and the exponent decreases by 1 in each successive term.
4. The exponent of b is 0 in the first term, and the exponent increases by 1 in each successive term.
5. The sum of the exponents in any term is n.

binomial expansion

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Pascal's △

$(a+b)^4$ 4th row

row 0: 1
row 1: 1 1
row 2: 1 2 1
row 3: 1 3 3 1
row 4: 1 4 6 4 1
row 5: 1 5 10 10 5 1
row 6: 1 6 15 20 15 6 1

Find each product.

$(3x+1)^4$

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

$81x^4 + 108x^3 + 54x^2 + 12x + 1$

$(x-y)^5$

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

$x^5 - 5x^4y + 10x^3y^2 - 10x^2y^3 + 5xy^4 - y^5$

examples

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Conclusion

1. How do you multiply polynomials? FOIL, Pascals △
2. How do you use the Binomial Theorem? Pascals △
3. What else can we use to get the coefficients?
4. Questions????

Assignment

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