

DATE: 4B

ESSENTIAL QUESTION(S): How do you use Pascal's triangle to expand binomials? How do you multiply polynomials?

REVIEW:

Video for this section:



NOTES:

Review:

Multiply the following binomials.

a.  $(x+3)(x+4)$

$x^2 + 7x + 12$

b.  $(x+7)(x-2)$

$x^2 + 5x - 14$

Use a strategy of your choice to multiply the following:

a.  $(x+5)(x^2-x-3)$

$x^3 + 4x^2 - 8x - 15$

b.  $(x-2)(2x^2+6x+1)$

$2x^3 + 2x^2 - 11x - 2$

c.  $(x+2)(x-2)(x+3)$

$(x^2-4)(x+3)$   
 $x^3 + 3x^2 - 4x - 12$

d.  $(x+1)^2$

$(x+1)(x+1)$   
 $x^2 + 2x + 1$

a.  $x+5$

$x^2$	$x^3$	$5x^2$
$-x$	$-x^2$	$-5x$
$-3$	$-3x$	$-15$

$x^2 - 4$

c.

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

Video for this section:



Pascal's Triangle for polynomials

is used to find the coefficients for a binomial expansion.

Power	Coefficients	Pascal's Triangle
$(x+a)^0$	1	1
$(x+a)^1$	$x+a$	1 1
$(x+a)^2$	$x^2 + 2ax + a^2$	1 2 1
$(x+a)^3$	$x^3 + 3ax^2 + 3a^2x + a^3$	1 3 3 1
$(x+a)^4$	$x^4 + 4ax^3 + 6a^2x^2 + 4a^3x + a^4$	1 4 6 4 1
$(x+a)^5$	$x^5 + 5ax^4 + 10a^2x^3 + 10a^3x^2 + 5a^4x + a^5$	1 5 10 10 5 1
$(x+a)^6$		1 6 15 20 15 6 1

$x^6 + 6ax^5 + 15a^2x^4 + 20a^3x^3 + 15a^4x^2 + 6a^5x + a^6$

**Example 1:**

Using Pascal's triangle find the product for each .

c.  $(x + 2)^3$   $a = 2$

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

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

d.  $(x + 5)^4$

$$x^4 + 4(5)x^3 + 6(5)^2x^2 + 4(5)^3x + 5^4$$

$$x^4 + 20x^3 + 150x^2 + 500x + 625$$

a.  $(x - 2)^3$

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

b.  $(x + 3)^4$

$$x^4 + 3x^3 + 9x^2 + 27x + 81$$