

Name: Key

Date: \_\_\_\_\_

Day 8- Multiplying Binomials and Polynomials

Do Now: Multiply the following.

1.  $3x(5x^2 - 2)$

$15x^3 - 6$

2.  $6y^3(9x^2y^9 - 4x + 2)$

$54x^2y^{12} - 24xy^3 + 12y^3$

3.  $-10x^3(2x^2 - 3x - 1)$

$-20x^5 + 30x^4 + 10x^3$

To multiply polynomials and polynomials, we will use the distributive property and the exponent rules.

Method 1: Foil

Example:

$(3x^2 + 4)(x - 9)$   
 $3x^3 - 27x^2 + 4x - 36$

Method 2: Box Method

Example:

$(4y - 3)(y + 2)$

	$4y$	$-3$	
$y$	$4y^2$	$-3y$	$4y^2 + 5y - 6$
$+2$	$8y$	$-6$	

$4y^2 - 3y + 8y - 6$

Practice:

1.  $(5x^2 + 3x - 3)(2x - 1)$

$5x^2 + 3x - 3$

	$5x^2$	$+3x$	$-3$
$2x$	$10x^3$	$+6x^2$	$-6x$
$-1$	$-5x^2$	$-3x$	$+3$

$10x^3 + 6x^2 - 5x^2 - 3x - 6x + 3$   
 $10x^3 + x^2 - 9x + 3$

2.  $(-6x - 32)(3x^2 + 2x - 5)$

$3x^2 + 2x - 5$

	$3x^2$	$+2x$	$-5$
$-6x$	$-18x^3$	$-12x^2$	$+30x$
$-32$	$-96x^2$	$-64x$	$+160$

$-18x^3 - 108x^2 - 34x + 160$

## Multiplying a Binomial by a Trinomial (A)

Simplify each expression.

1.  $(6c^4 - c^3)(9c^3 - 7c^2 - 3c)$

$6c^4$	$9c^3 - 7c^2 - 3c$	
$54c^7$	$-42c^6$	$-18c^5$
$-c^3$		
$-9c^6$	$+7c^5$	$+3c^2$

$54c^7 - 51c^6 - 11c^5 + 3c^2$

2.  $(a^4 + 5a^3)(5a^4 - 4a^3 - 5a^2)$

$a^4$	$5a^4 - 4a^3 - 5a^2$	
$5a^8$	$-4a^7$	$-5a^6$
$5a^3$		
$25a^7$	$-20a^6$	$-25a^5$

$5a^8 + 21a^7 - 25a^6 - 25a^5$

3.  $(7k^2 - 9k)(9k^4 - 2k^3 + 3k^2)$

$63k^6 - 14k^5 + 21k^4 - 81k^5 + 18k^4 - 27k^3$

$63k^6 - 95k^5 + 39k^4 - 27k^3$

4.  $(2q^2 - q)(2q^2 + 9q - 2)$

$4q^4 + 18q^3 - 4q^2 - 2q^3 - 9q^2 + 2q = 4q^4 + 16q^3 - 13q^2 + 2q$

5.  $(-8g^4 - 6g^3)(-9g^3 + 2g^2 + 7g)$

$-8g^4$	$-9g^3 + 2g^2 + 7g$	
$72g^7$	$-16g^6$	$-56g^5$
$-6g^3$		
$54g^6$	$-12g^5$	$-42g^4$

$72g^7 + 48g^6 - 68g^5 - 42g^4$

6.  $(-5b^2 - b)(9b^3 - b^2 - 2b)$

$-45b^5 + 5b^4 + 10b^3 - 9b^4 + b^3 + 2b^2 = -45b^5 - 4b^4 + 11b^3 + 2b^2$

7.  $(-k + 8)(-2k^2 - 8k - 1)$

$2k^3 + 8k^2 + k - 16k^2 - 64k - 8 = 2k^3 - 8k^2 - 63k - 8$

8.  $(-7s^4 - 6s^3)(8s^2 - 7s + 4)$

$-56s^6 + 49s^5 - 28s^4 - 48s^5 + 42s^4 + 24s^3 = -56s^6 - 5s^5 + 14s^4 + 24s^3$

9.  $(z^4 + 3z^3)(6z^3 - 4z^2 + 4z)$

$6z^7 - 4z^6 + 4z^5 + 18z^6 - 12z^5 + 12z^4 = 6z^7 + 14z^6 - 8z^5 + 12z^4$

10.  $(2g^3 + g^2)(4g^3 - 7g^2 - 3g)$

$8g^6 - 14g^5 - 6g^4 + 4g^5 - 7g^4 - 3g^3 = 8g^6 - 10g^5 - 13g^4 - 3g^3$

## Multiplying Polynomials

Find each product.

1)  $6v(2v + 3)$

$$12v^2 + 18v$$

2)  $-7(-5v - 8)$

$$35v + 56$$

3)  $2x(-2x - 3)$

$$-4x^2 - 6x$$

4)  $-4(v + 1)$

$$-4v - 4$$

5)  $(2n + 2)(6n + 1)$

	$2n+2$		
$6n$	$12n^2$	$12n$	$12n^2 + 14n + 2$
$+1$	$2n$	$+2$	

7)  $(x - 3)(6x - 2)$

$$6x^2 - 2x - 18x + 6$$

$$6x^2 - 20x + 6$$

9)  $(6p + 8)(5p - 8)$

$$30p^2 - 48p + 40p - 64$$

$$30p^2 - 8p - 64$$

11)  $(2a - 1)(8a - 5)$

$$16a^2 - 10a - 8a + 5$$

$$16a^2 - 18a + 5$$

6)  $(4n + 1)(2n + 6)$

	$4n+1$		
$2n$	$8n$	$2n$	$8n + 26n + 6$
$+6$	$24n$	$+6$	

8)  $(8p - 2)(6p + 2)$

$$48p^2 + 16p - 12p - 4$$

$$48p^2 + 4p - 4$$

10)  $(3m - 1)(8m + 7)$

	$3m-1$		
$8m$	$24m^2$	$-8m$	$24m^2 + 13m - 7$
$+7$	$21m$	$-7$	

12)  $(5n + 6)(5n - 5)$

$$25n^2 - 25n + 30n - 30$$

$$25n^2 + 5n - 30$$

13)  $(4p-1)^2$   
 $(4p-1)(4p-1)$

$16p^2 - 4p - 4p + 1$   
 $16p^2 - 8p + 1$

15)  $(6n+3)(6n-4)$

$36n^2 - 24n + 18n - 12$   
 $36n^2 - 6n - 12$

17)  $(6k+5)(5k+5)$

$6k+5$   

$5k$	$30k^2$	$25k$
$+5$	$30k$	$25$

 $30k^2 + 55k + 25$

19)  $(4a+2)(6a^2-a+2)$

$6a^2 - a + 2$   

$+a$	$24a^3$	$-4a^2$	$+8a$
$+2$	$12a^2$	$-2a$	$+4$

 $24a^3 + 8a^2 + 6a + 2$

21)  $(7r^2-6r-6)(2r-4)$

$7r^2 - 6r - 6$   

$2r$	$14r^3$	$-12r^2$	$-12r$
$-4$	$-28r^2$	$24r$	$+24$

 $14r^3 - 40r^2 - 12r + 24$

23)  $(6n^2-6n-5)(7n^2+6n-5)$

$6n^2 - 6n - 5$   

$7n^2$	$42n^4$	$-42n^3$	$-40n^2$
$-6n$	$36n^3$	$-36n^2$	$-30n$
$-5$	$-30n^2$	$30n$	$+25$

 $42n^4 - 6n^3 - 106n^2 + 25$

14)  $(7x-6)(5x+6)$

$35x^2 + 42x - 30x - 36$   
 $35x^2 + 12x - 36$

16)  $(8n+1)(6n-3)$

$48n^2 - 24n + 6n - 3$   
 $48n^2 - 18n - 3$

18)  $(3x-4)(4x+3)$

$3x-4$   

$4x$	$12x^2$	$-16x$
$+3$	$9x$	$-12$

 $12x^2 - 7x - 12$

20)  $(7k-3)(k^2-2k+7)$

$7k^3 - 14k^2 + 49k - 3k^2 + 6k - 21$   
 $7k^3 - 17k^2 + 55k - 21$

22)  $(n^2+6n-4)(2n-4)$

$n^2 + 6n - 4$   

$2n$	$2n^3$	$12n^2$	$-8n$
$-4$	$-4n^2$	$-24n$	$+16$

 $2n^3 + 8n^2 - 32n + 16$