

# Multiplying Polynomials

#5

Important Prerequisite skills:

DISTRIBUTIVE PROPERTY

$$a(b+c) = \underline{ab+ac}$$

EX.1:  $2(x^2-8)$

$$\underline{2x^2-16}$$

EX.2:  $-5(3-b^3)$

$$\underline{-15+5b^3}$$

PRODUCT OF POWERS PROPERTY

$$a^b \cdot a^c = \underline{a^{(b+c)}}$$

EX.3:  $x^3 \cdot x^6 = x^{3+6}$   
 $= \underline{x^9}$

EX.4:  $2m^2 \cdot m^1 = \underline{2m^3}$

\*  $b^6 \cdot -3b^2 = \underline{-3b^8}$

To multiply polynomials, we will use the box method.

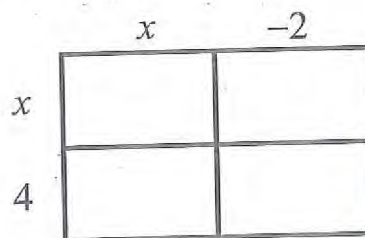
$$(x+4)(x-2)$$

Step 1. Determine the number of terms that each polynomial has and use that to make the correct size box.

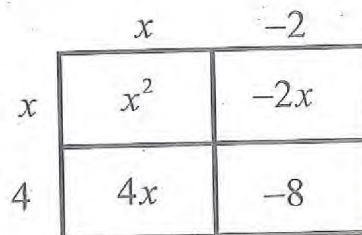
Both polynomials have 2 terms, so we will make a box that is a 2 by 2.



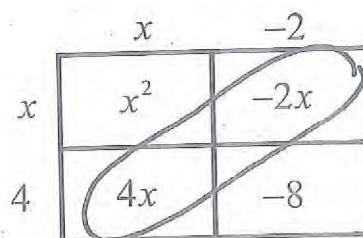
Step 2. Write the first polynomial along the left side of the box and the second polynomial along the top of the box.



Step 3. Multiply the terms that create the first box and write the product inside the box. Do the same for the other boxes.



Step 4. Combine any like terms and write your final answer.



Answer:  $x^2 + 2x - 8$

## Multiplying Polynomials

Find each product.

1)  $(3a - 4)(7a + 6)$

2)  $(8n - 7)(5n + 2)$

3)  $(7x - 4)(7x - 5)$

4)  $(3n + 3)(7n - 7)$

5)  $(6v - 6)(6v^2 - 8v + 2)$

6)  $(4n - 4)(7n^2 - 5n + 6)$

7)  $(5x + 6)(x^2 - 4x + 7)$

8)  $(3b + 5)(4b^2 + 5b - 6)$

9)  $(3v^2 + 7v + 5)(3v^2 - 7v - 6)$

10)  $(5x^2 - 8x + 4)(2x^2 - 8x + 7)$

11)  $(x^2 + 7x - 2)(2x^2 + 4x - 2)$

12)  $(x^2 + 7x + 8)(3x^2 + 4x + 7)$

**More Practice on Concept 7!! Simplify each sum.**

13)  $(5 + 5b^3 + 8b^2) + (6b^2 - 4 - 3b^4)$

14)  $(3a^2 - 6 - 3a^3) + (6a^3 - 1 + 8a^2)$

**More Practice on Concept 8!! Simplify each difference.**

15)  $(8n + 8n^2 + 7n^3) - (8n^2 - 7n + 2n^3)$

16)  $(7x^3 - 7x^2 + 3) - (5x^3 + 4 + x^2)$



Examples and Additional Practice

## Multiplying Polynomials

Find each product.

1)  $(3a - 4)(7a + 6)$

	$7a$	$6$
$3a$	$21a^2$	$18a$
$-4$	$-28a$	$-24$

$21a^2 - 10a - 24$

2)  $(8n - 7)(5n + 2)$

	$5n$	$2$
$8n$	$40n^2$	$16n$
$-7$	$-35n$	$-14$

$40n^2 - 19n - 14$

3)  $(7x - 4)(7x - 5)$

	$7x$	$-5$
$7x$	$49x^2$	$-35x$
$-4$	$-28x$	$20$

$49x^2 - 63x + 20$

4)  $(3n + 3)(7n - 7)$

	$7n$	$-7$
$3n$	$21n^2$	$-21n$
$3$	$21n$	$-21$

$21n^2 - 21$

5)  $(6v - 6)(6v^2 - 8v + 2)$

	$6v^2$	$-8v$	$2$
$6v$	$36v^3$	$-48v^2$	$12v$
$-6$	$-36v^2$	$48v$	$-12$

$36v^3 - 84v^2 + 60v - 12$

6)  $(4n - 4)(7n^2 - 5n + 6)$

	$7n^2$	$-5n$	$6$
$4n$	$28n^3$	$-20n^2$	$24n$
$-4$	$-28n^2$	$20n$	$-24$

$28n^3 - 48n^2 + 44n - 24$

7)  $(5x + 6)(x^2 - 4x + 7)$

	$x^2$	$-4x$	$7$
$5x$	$5x^3$	$-20x^2$	$35x$
$6$	$6x^2$	$-24x$	$42$

$5x^3 - 14x^2 + 11x + 42$

8)  $(3b + 5)(4b^2 + 5b - 6)$

	$4b^2$	$5b$	$-6$
$3b$	$12b^3$	$15b^2$	$-18b$
$5$	$20b^2$	$25b$	$-30$

$12b^3 + 35b^2 + 7b - 30$

9)  $(3v^2 + 7v + 5)(3v^2 - 7v - 6)$

$9v^4 - 52v^2 - 77v - 30$

10)  $(5x^2 - 8x + 4)(2x^2 - 8x + 7)$

$10x^4 - 56x^3 + 107x^2 - 88x + 28$

11)  $(x^2 + 7x - 2)(2x^2 + 4x - 2)$

$2x^4 + 18x^3 + 22x^2 - 22x + 4$

12)  $(x^2 + 7x + 8)(3x^2 + 4x + 7)$

$3x^4 + 25x^3 + 59x^2 + 81x + 56$

More Practice on Concept 7!! Simplify each sum.

13)  $(5 + 5b^3 + 8b^2) + (6b^2 - 4 - 3b^4)$   
 $5 + 5b^3 + 8b^2 + 6b^2 - 4 - 3b^4$   
 $-3b^4 + 5b^3 + 14b^2 + 1$

14)  $(3a^2 - 6 - 3a^3) + (6a^3 - 1 + 8a^2)$   
 $3a^2 - 6 - 3a^3 + 6a^3 - 1 + 8a^2$   
 $3a^3 + 11a^2 - 7$

More Practice on Concept 8!! Simplify each difference.

15)  $(8n + 8n^2 + 7n^3) - (8n^2 - 7n + 2n^3)$   
 $8n + 8n^2 + 7n^3 - 8n^2 + 7n - 2n^3$   
 $5n^3 + 15n$

16)  $(7x^3 - 7x^2 + 3) - (5x^3 + 4 + x^2)$   
 $7x^3 - 7x^2 + 3 - 5x^3 - 4 - x^2$   
 $2x^3 - 8x^2 - 1$

1)

	$3V^2$	$-7V$	$-6$
$3V^2$	$9V^4$	<del><math>-21V^3</math></del>	$-18V^2$
$7V$	<del><math>21V^3</math></del>	$-49V^2$	$-42V$
$5$	$15V^2$	<del><math>-35V</math></del>	$-30$

$$9V^4 - 52V^2 - 77V - 30$$

10)

	$2X^2$	$-8X$	$7$
$5X^2$	$10X^4$	<del><math>-40X^3</math></del>	$35X^2$
$-8X$	<del><math>-16X^3</math></del>	$64X^2$	<del><math>-56X</math></del>
$4$	$8X^2$	<del><math>-32X</math></del>	$28$

$$10X^4 - 56X^3 + 107X^2 - 88X + 28$$

11)

	$2X^2$	$4X$	$-2$
$X^2$	$2X^4$	<del><math>4X^3</math></del>	$-2X^2$
$7X$	<del><math>14X^3</math></del>	$28X^2$	<del><math>-14X</math></del>
$-2$	<del><math>-4X^2</math></del>	<del><math>-8X</math></del>	$4$

$$2X^4 + 18X^3 + 22X^2 - 22X + 4$$

12)

	$3X^2$	$4X$	$7$
$X^2$	$3X^4$	<del><math>4X^3</math></del>	$7X^2$
$7X$	<del><math>21X^3</math></del>	$28X^2$	<del><math>49X</math></del>
$8$	$24X^2$	<del><math>32X</math></del>	$56$

$$3X^4 + 25X^3 + 59X^2 + 81X + 56$$