

Multiplying Binomials Practice

1. Use the box method to determine the product of  $(2x + 1)(3x + 1)$ .  
 A)  $6x^2 + 1$       B)  $6x^2 + 2$       C)  $6x^2 + 5x + 1$       D)  $6x^2 + 5x + 2$

Use the following information to answer the next question.

	$2x$	$M$
$K$	$-8x^2$	$-28x$
$-3$	$-6x$	$-21$

2. When  $(2x + M)(K - 3)$  is expanded, the result is  $-8x^2 - 34x - 21$ . The terms representing  $K$  and  $M$  are  
 A)  $K = -4x$  and  $M = -18$   
 B)  $K = -4x$  and  $M = 7$   
 C)  $K = 4x$  and  $M = -18$   
 D)  $K = 4x$  and  $M = -7$

3. What are the dimensions of the box below?

	$\overline{20x^2}$	$\overline{8x}$
$\overline{\quad}$	$45x$	$18$

- A)  $(5x + 2)(4x + 9)$   
 B)  $(5x + 3)(4x + 6)$   
 C)  $(2x + 2)(10x + 9)$   
 D)  $(2x + 3)(10x + 6)$

4. The product of  $(6x - 1)(2x + 3)$  is  $12x^2 + kx - 3$ . The value of  $K$  is \_\_\_\_.

5. The result of the expansion of  $(10y^3 + 9xy)^2$  is

A)  $100y^6 + 81x^2y^2$

B)  $100y^9 + 81x^2y^2$

C)  $100y^6 + 180xy^4 + 81x^2y^2$

D)  $100y^6 + 90xy^4 + 81x^2y^2$

6. An expression for one side of a square is  $(2x + 7)$ . Determine a simplified expression for the area of the square **added** to the expression for the perimeter of the square.

A)  $4x^2 + 36x + 77$

B)  $4x^2 + 36x + 56$

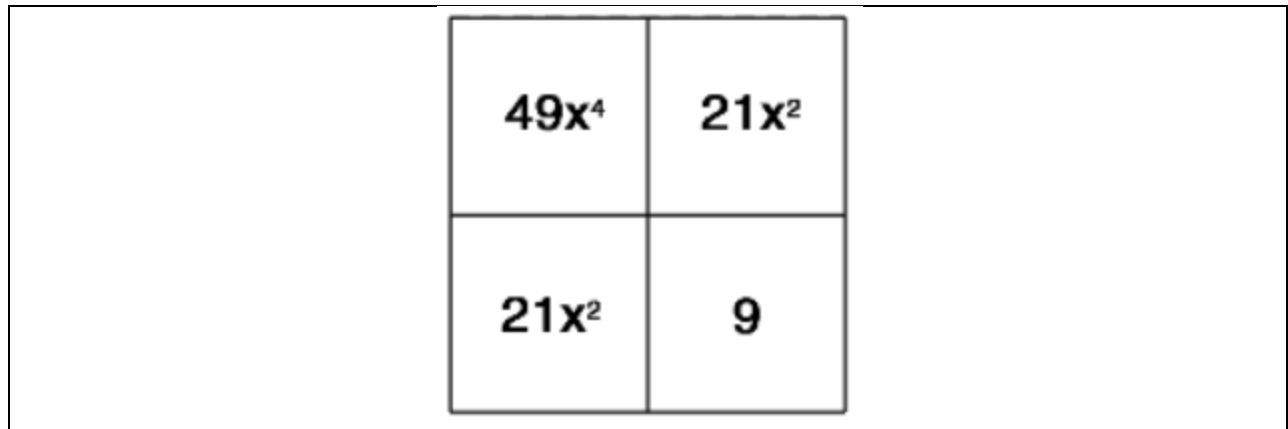
C)  $4x^2 + 28x + 77$

D)  $4x^2 + 28x + 56$

7. Fill in the 4 parts of the box below. Write the multiplication statement involving the two binomials.

	<b>1</b>	<b>-8mn</b>
<b>-5m</b>		
<b>3n<sup>2</sup></b>		

Use the diagram below to answer the next question.



8. Write an expression to represent the perimeter of this square.

9. The product of  $(9x - M)(3x - N)$  is  $27x^2 - 96x + 20$ . Determine the values of  $M$  and  $N$ . Explain.

## Multiplying Binomials Practice Solutions

1. Use the box method to determine the product of  $(2x + 1)(3x + 1)$ .

- A)  $6x^2 + 1$       B)  $6x^2 + 2$       C)  $6x^2 + 5x + 1$       D)  $6x^2 + 5x + 2$

**Solution**

	$2x$	$1$
$3x$	$6x^2$	$3x$
$1$	$2x$	$1$

Add the 4 parts of the box by combining like terms.

$$6x^2 + 5x + 1$$

The correct answer is C.

Use the following information to answer the next question.

	$2x$	$M$
$K$	$-8x^2$	$-28x$
$-3$	$-6x$	$-21$

2. When  $(2x + M)(K - 3)$  is expanded, the result is  $-8x^2 - 34x - 21$ . The terms representing K and M are

- A)  $K = -4x$  and  $M = -18$   
B)  $K = -4x$  and  $M = 7$   
C)  $K = 4x$  and  $M = -18$   
D)  $K = 4x$  and  $M = -7$

**Solution**

The product of  $(2x)$  and  $(K)$  must be  $-8x^2$ . Therefore,  $K = \frac{-8x^2}{2x}$  or  $-4x$ .

We now know that that  $(-4x)(M) = -28x$ . Therefore,  $M = \frac{-28x}{-4x}$  or  $7$ .

The correct answer is B.

3. What are the dimensions of the box below?

	$20x^2$	$8x$
	$45x$	$18$

- A)  $(5x + 2)(4x + 9)$
- B)  $(5x + 3)(4x + 6)$
- C)  $(2x + 2)(10x + 9)$
- D)  $(2x + 3)(10x + 6)$

Solution

We know that the product of the first two terms in the binomials must equal  $20x^2$ . This requirement is satisfied by all four options.

We also know that the product of the last two terms in the binomials must equal 18. This requirement is also satisfied by all four options.

We need to look for the combination of terms that yields both  $8x$  and  $45x$ .

The correct answer is A.

4. The product of  $(6x - 1)(2x + 3)$  is  $12x^2 + kx - 3$ . The value of K is 16.

Solution

	$6x$	$-1$
$2x$	$12x^2$	$-2x$
$3$	$18x$	$-3$

The product of  $(6x - 1)(2x + 3)$  is  $12x^2 + 16x - 3$ .

The value of K is 16.

5. The result of the expansion of  $(10y^3 + 9xy)^2$  is

- A)  $100y^6 + 81x^2y^2$
- B)  $100y^9 + 81x^2y^2$
- C)  $100y^6 + 180xy^4 + 81x^2y^2$
- D)  $100y^6 + 90xy^4 + 81x^2y^2$

Solution

	$10y^3$	$9xy$
$10y^3$	$100y^6$	$90xy^4$
$9xy$	$90xy^4$	$81x^2y^2$

The correct answer is C.

6. An expression for one side of a square is  $(2x + 7)$ . Determine a simplified expression for the area of the square **added** to the expression for the perimeter of the square.

- A)  $4x^2 + 36x + 77$
- B)  $4x^2 + 36x + 56$
- C)  $4x^2 + 28x + 77$
- D)  $4x^2 + 28x + 56$

Solution

To determine the area of the square, multiply the two dimensions together;

$$(2x + 7)^2$$

	$2x$	$7$
$2x$	$4x^2$	$14x$
$7$	$14x$	$49$

An expression for the area is  $4x^2 + 28x + 49$ .

An expression for the perimeter to the square is  $4(2x + 7)$ , or  $8x + 28$ .

An expression for the area of the square **added** to the expression for the perimeter is:

$$(4x^2 + 28x + 49) + (8x + 28) = 4x^2 + 36x + 77$$

The correct answer is A.

7. Fill in the 4 parts of the box below. Write the multiplication statement involving the two binomials.

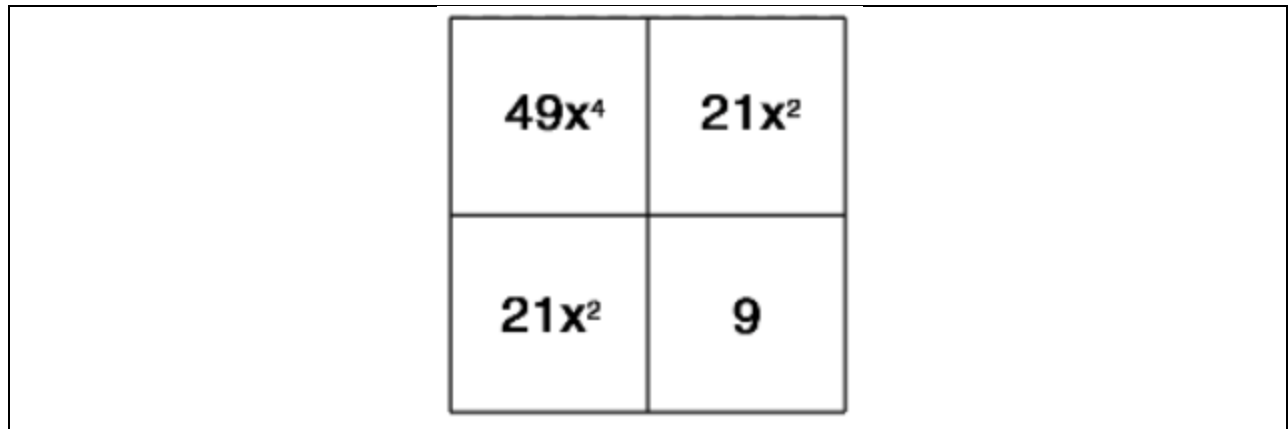
	1	-8mn
-5m		
3n <sup>2</sup>		

Solution

	1	-8mn
-5m	<b>-5m</b>	<b>40m<sup>2</sup>n</b>
3n <sup>2</sup>	<b>3n<sup>2</sup></b>	<b>-24mn<sup>3</sup></b>

$$(1 - 8mn)(-5m + 3n^2) = -5m + 40m^2n + 3n^2 - 24mn^3$$

Use the diagram below to answer the next question.



8. Write an expression to represent the perimeter of this square.

**Solution**

To find the perimeter, the side length needs to be determined. Take the square root of  $49x^4$ , which is  $7x^2$ , and add this to the square root of 9, which is 3.

The side length is  $7x^2 + 3$ .

Since there are 4 equal sides in a square, and the perimeter is the distance around the outside of the square, multiply  $4(7x^2 + 3)$ .

An expression to represent the perimeter is  $28x^2 + 12$ .

9. The product of  $(9x - M)(3x - N)$  is  $27x^2 - 96x + 20$ . Determine the values of M and N. Explain.

**Solution**

We know that the product of M and N must be 20. Possible values will be factors of 20; 1 and 20, or 2 and 10, or 4 and 5. The correct pair of factors must result in a middle term of  $-96x$ .



Test 1 and 20.

	$9x$	$-1$
$3x$	$27x^2$	$-3x$
$-20$	$-180x$	$20$

The middle term is  $-183x$ . These are not the correct numbers.

Test 20 and 1.

	$9x$	$-20$
$3x$	$27x^2$	$-60x$
$-1$	$-9x$	$20$

The middle term is  $-69x$ . These are not the correct numbers.

Test 2 and 10.

	$9x$	$-2$
$3x$	$27x^2$	$-6x$
$-10$	$-90x$	$20$

The middle number is  $-96x$ . These are the correct numbers.

The value of  $M$  is 2 and the value of  $N$  is 10.