**Expanding Binomials**

***TERMINOLOGY***

Polynomial: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Term: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Monomial: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Binomial: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Trinomial: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Review of Expanding

Expanding: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Distributive Property: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example: Simplify the following.

1. $12x+3y-13x+5y$ 2. $\left(3x+4y\right)- \left(5x-6y\right)$

***MULTIPLYING BINOMIALS***

Distributive Property

F



O

I

L

Examples

|  |  |  |  |
| --- | --- | --- | --- |
| 1. (*x* + 2) (*x* + 4)
 | 1. (*x* – 2) (*x* + 4)
 | 1. (*x* – 2)( *x* – 4)
 | 1. (*x* – 3)2
 |

**5.** State an ***expression*** for the **area** of the shape given below.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

Two Special Products

There are **two special cases** of binomial products which **DO NOT** require the use of the distributive property or FOIL to simplify.

1. **Squaring a Binomial**

|  |  |  |
| --- | --- | --- |
| Expand and simplify | (x – 2)2 | (4x + 3)2 |

In general:



1. **Difference of Squares**

|  |  |  |
| --- | --- | --- |
| Expand and simplify | (x + 3)(x – 3) | (4x + 2)(4x – 2)  |

In general



***EXAMPLES***

Simplify each of the following.

|  |  |  |  |
| --- | --- | --- | --- |
| 1. (x + 4)2
 | 1. (x – 5)(x + 5)
 | 1. (3x – 7)2
 | 1. (2x + 3)(2x – 3)
 |

Expand Binomials Practice

1. **Expand the following. Use your knowledge of special products wherever possible.**

|  |  |  |
| --- | --- | --- |
| **1.** (x + 3)(x + 4) | **2.** (x – 3)(x + 4) | **3.** (x – 2)(x + 2) |
| **4.** (7x + 2)(5x – 8) | **5.** (x + 3)2 | **6.** (2x + 3)(3x – 3) |
| **7.** (x + 2)2 | **8.** (3x – 1)2 | **9.** (x – 8)(x – 8)  |

1. **Using the formulas for area and perimeter of a rectangle, find the area and perimeter of the rectangle shown.**

**2x + 1**

**3x - 2**

**3x - 2**

**2x + 1**

1. **Using your skills of binomial multiplication expand and simplify each of the following.**

|  |  |  |
| --- | --- | --- |
| 1. y = (x – 3)(x + 5)
 | 1. y = (3x +7)(3x – 7)
 | 1. y = (5x – 3)2
 |

1. **Expand and simplify.**

 **1)** 3*x*(*x* − 6) **2)** (*x* − 6)(*x* + 2) **3)** (*x* − 7)(*x* + 7)

 **4)** (*x* − 11)(*x* + 1) **5)** (*x* + 7)(*x* + 7) **6)** (2*x* − 9)2

1. **Write an expression, in simplified form, for the shaded region of each figure.**

|  |  |
| --- | --- |
| 1. taBLM5-3-5s1-7
 | 1. taBLM5-3-5s1-9
 |

1. **A box with a rectangular base and no lid can be created from a cardboard template as shown. The height of the box, *x*, is variable.**

side

side

side

side

**20 cm**

**12 cm**

**x**

base

1. Find an expression for the surface area of the cardboard.
2. Calculate the total area of the cardboard for boxes with heights 3cm, 5cm, and 10 cm.
3. If the cardboard costs 5 **₵**/ 100cm2, how much will each box in part b) cost?
4. **Expand and simplify.**

**a)** (3*x* − 7)(2*x* + 1) **b)** (8*x* + 1)(2*x* − 5)

**c)** (3*x* + 1)(5*x* − 3) **d)** (2 − 4*x*)(3 + *x*)

**e)** (3*x* + 1)2 **f)** (2*x* − 5)2

**g)** (5*x* + 3)2 **h)** (9*x* − 1)2

 **i)** (10*x* + 3)2 **j)** (11 + 5*x*)2