Name:_____**Date:**_____**Period:**_____

**Polynomial Operations Task**   **SHOW YOUR WORK!**

Tier 1 (up to 72 points) Complete #1-4

Tier 2 (up to 90 points) Complete #1-6 Do not move up to Tier 2 if you have not completed all of Tier 1.

Tier 3 (up to 100 points) Complete #1-7 Do not move up to Tier 3 if you have not completed all of Tier 1 & Tier 2.

Jasmine and her mother are planting a garden. They want to plant squash, pumpkins, corn, beans and potatoes. Their plan for the field layout, in feet, is shown in the figure below. Be sure your polynomials include the correct units. As part of your shown work, be sure to illustrate the box method for multiplication and the X game for factoring if needed.
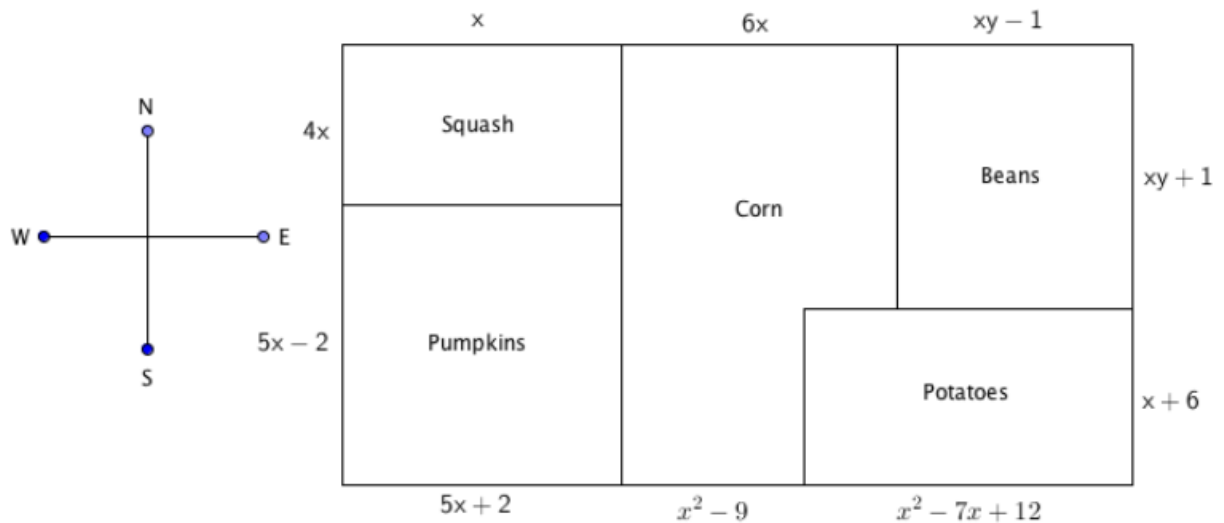
1. Look at the southern edge of the field.

    a. Write an expression that represents the length of the south side of the field.

    b. Simplify your expression in part a. Then write the polynomial in standard form.

    c. Determine an expression for the total area of the garden using the west side and south side of the field. Your final answer should be simplified and in standard form.

2. Look at the pumpkin patch.
   a. Explain how you could find the perimeter of the pumpkin patch and why the perimeter would be useful in this situation.

   b. Write an expression that represents the perimeter of the pumpkin patch.

   c. Simplify your expression in part a. Then write the polynomial in standard form.

3. Look at the potato patch.
   a. Explain how you could find the area of the potato patch and why the area would be useful in this situation.

   b. Write an expression that represents the area of the potato patch.

   c. Simplify your expression in part a. Then write the polynomial in standard form.

4. Jasmine and her mother decide they want to plant three additional patches of produce with the given areas. Find the dimensions of each patch.

   a. The area of the strawberry patch is $s(x) = 16x^2 + 4x$.

   b. The area of the cucumber field is $c(x) = x^2 - 4x - 21$.

   c. The area of the tomato field is $t(x) = x^2 - 36$.

5. At the last minute, Jasmine decided to include a zucchini patch in the field layout. She wants to use half the length and half the width of the squash patch in order to plant zucchini.
   a. Write an expression that represents the area of the zucchini patch.

   b. Simplify your expression in part a. Then write the polynomial in standard form.

6. Look at the bean patch.
   a. Explain how you could find the volume of the bean patch and why the volume would be useful in this situation.

   b. Write an expression that represents the volume of the bean patch if the bean plants reach a height of $x + 3$.

   c. Simplify your expression in part b. Then write the polynomial in standard form.

   d. Suppose $x = 2$ and $y = 5$. What would the volume of the bean patch be? Be sure to include the correct units.

7. Look at the corn patch.
   a. Write and simplify (in standard form) an expression for the perimeter of the corn patch.

   b. Write and simplify (in standard form) an expression for the area of the corn patch.

   c. Suppose the height of the corn patch is $x - 2$. Write and simplify an expression for the volume of the corn patch.