Quadratic Expressions: Inquiry and Application Questions

Complete each of the following questions on a separate sheet of lined paper.
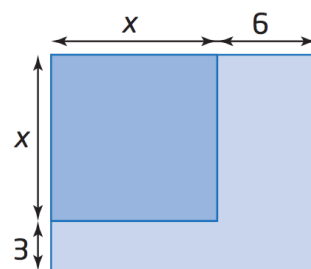
We will take these up in our next class together.

1. The predicted flight path of a firework is defined by the relation $h = -2(d-3)(d-15)$, where d is the horizontal distance, in metres, from a safety wall, and h is the height, in metres.

    a. Expand and simplify the relation.

    b. Verify that the simplified relation from part a) is equivalent to the original relation given. To do this, use each relation to find the height of the firework when it is 10 metres away from the safety wall.
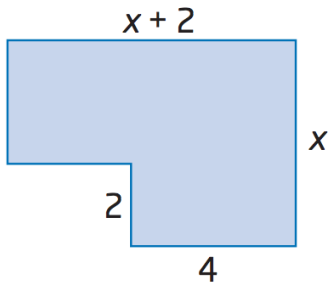
2. A square garden has side length x.

    One dimension is increased by 6 m and the other is increased by 3 m.

    a. Write an algebraic expression for the area of the original garden.

    b. Write an algebraic expression for the area of the new garden.

    c. Expand and simplify the expression you found for part b).

    d. Find an expression that represents the *increase* in area (from the old garden to the new garden).

    e. If x represents 12 m, how many square metres was the area of the garden increased by?

3. A square has side length $3x$. One dimension is increased by $2y$ and the other is decreased by $2y$.

    a. Find an algebraic expression for the area of the original square. Expand.

    b. Find an algebraic expression for the area of the rectangle resulting from the modified dimensions. Expand.

    c. Find a simplified algebraic expression for the *change* in area.

    d. Calculate the change in area if x represents 8 cm and y represents 5 ✓

4. Given the figure:

    a. Use two methods to determine an algebraic expression to represent the area of the figure.

    b. Prove that the two algebraic expressions are equivalent.