Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Equations & Functions Applications**

1. Use the following expression below to answer parts (a) and (b).



* 1. Write an equivalent expression in standard form and collect like terms.
  2. Express the answer from part (a) as an equivalent expression in factored form.

1. Use the following information to solve the problems below.
   1. The largest side of a triangle is six more units than the smallest side. The third side is twice the smallest side. If the perimeter of the triangle is 25 units, write and solve an equation to find the lengths of all three sides of the triangle.
   2. The length of a rectangle is (𝑥+3) inches long, and the width is 325 inches. If the area is 15310 square inches, write and solve an equation to find the length of the rectangle.
2. A picture 1014 feet long is to be centered on a wall that is 1412 feet long. How much space is there from the edge of the wall to the picture?
   1. Solve the problem arithmetically.
   2. Solve the problem algebraically.
   3. Compare the approaches used in parts (a) and (b). Explain how they are similar.
3. In August, Cory begins school shopping for his triplet daughters.
   1. One day, he bought 10 pairs of socks for $2.50 each and 3 pairs of shoes for 𝑑 dollars each. He spent a total of $135.97. Write and solve an equation to find the cost of one pair of shoes.
   2. The following day Cory returned to the store to purchase some more socks. He had $40 to spend. When he arrived at the store, the shoes were on sale for 13 off. What is the greatest amount of pairs of socks Cory can purchase if he purchased another pair of shoes in addition to the socks?
4. Ben wants to have his birthday at the bowling alley with a few of his friends, but he can spend no more than $80. The bowling alley charges a flat fee of $45 for a private party and $5.50 per person for shoe rentals and unlimited bowling.
   1. Write an inequality that represents the total cost of Ben’s birthday for 𝑝 people given his budget.
   2. How many people can Ben pay for (including himself) while staying within the limitations of his budget?
   3. Graph the solution of the inequality from part (a).
5. Jenny invited Gianna to go watch a movie with her family. The movie theater charges one rate for 3D admission and a different rate for regular admission. Jenny and Gianna decided to watch the newest movie in 3D. Jenny’s mother, father, and grandfather accompanied Jenny’s little brother to the regular admission movie.
   1. Write an expression for the total cost of the tickets. Define the variables.
   2. The cost of the 3D ticket was double the cost of the regular admission ticket. Write an equation to represent the relationship between the two types of tickets.
   3. The family purchased refreshments and spent a total of $18.50. If the total amount of money spent on tickets and refreshments were $94.50, use an equation to find the cost of one regular admission ticket.