

ALGEBRA LAB GEAR

Algebra 1

■ Polynomial Arithmetic ■ Equations and Identities ■ Quadratics
■ Factoring ■ Graphing Connections

A1

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Patterns in Making a Square

Build each trinomial with the Lab Gear blocks. Arrange the blocks into a square. Complete the equation $area = side^2$. Some of the trinomials cannot be made into a square.

1. $x^2 + 8x + 16 =$ _____

2. $x^2 + 14x + 49 =$ _____

3. $x^2 + 10x + 25 =$ _____

4. $x^2 + 16x + 64 =$ _____

5. $x^2 + 4x + 16 =$ _____

6. $x^2 + 2x + 1 =$ _____

7. $x^2 + 4x + 4 =$ _____

8. $x^2 + 5x + 9 =$ _____

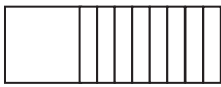
9. In each square, describe the pattern in which you arranged

a. the x-blocks. _____

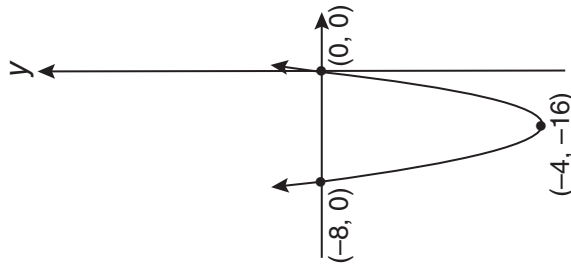
b. the yellow blocks. _____

10. List the polynomials above that could not be made into a square. Explain what was wrong with each of them.

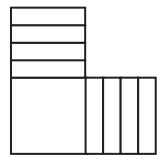
Quadratic Functions



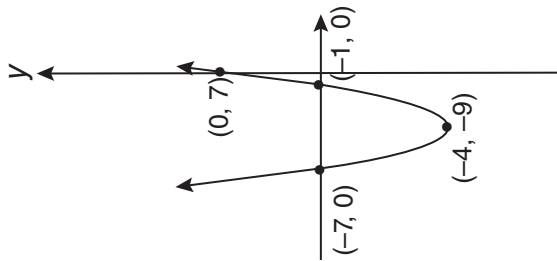
$$(x + 8)x = x^2 + 8x$$



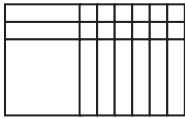
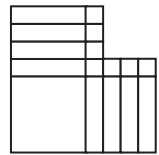
$$y = x^2 + 8x$$



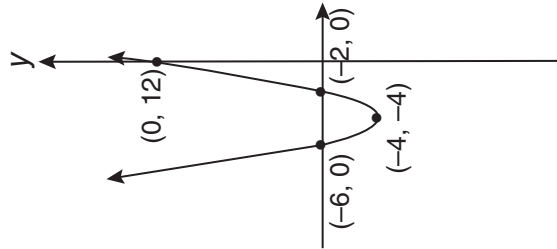
$$(x + 7)(x + 1) = x^2 + 8x + 7$$



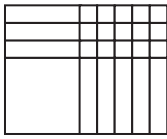
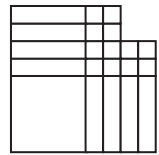
$$y = x^2 + 8x + 7$$



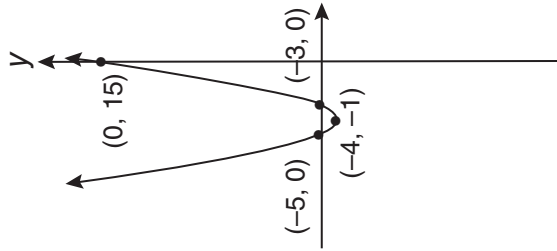
$$(x + 6)(x + 2) = x^2 + 8x + 12$$



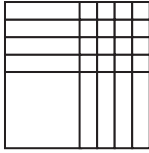
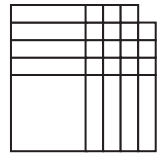
$$y = x^2 + 8x + 12$$



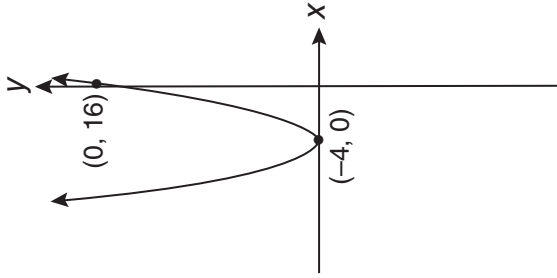
$$(x + 5)(x + 3) = x^2 + 8x + 15$$



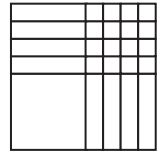
$$y = x^2 + 8x + 15$$



$$(x + 4)^2 = x^2 + 8x + 16$$



$$y = x^2 + 8x + 16$$



Solving by Factoring

Solve each equation, using factoring and the zero product principle. Use the Lab Gear or multiplication table format to factor. Show your work. *One cannot be factored.*

1. $x^2 + 7x + 12 = 0$

2. $x^2 + 5x + 6 = 0$

3. $x^2 + 11x + 10 = 0$

4. $x^2 + 8x + 15 = 0$

5. $x^2 + 13x = 0$

6. $x^2 + 2x + 4 = 0$

7. $x^2 + 5x + 4 = 0$

8. $4x^2 + 4x + 1 = 0$

9. $4x^2 + 10x = 0$

10. $3x^2 + 4x + 1 = 0$

11. $9x^2 + 21x + 6 = 0$

12. $2x^2 + 7x + 5 = 0$

Solving by Equal Squares

Solve the following equations using the equal squares method. Show your work. One problem is impossible. (The solutions are not necessarily integers.)

1. $x^2 = 64$

2. $x^2 + 6x + 9 = 0$

3. $9x^2 = 36$

4. $x^2 + 14x + 49 = -16$

5. $x^2 + 10x + 25 = 1$

6. $4x^2 + 12x + 9 = 25$

7. $4x^2 + 4x + 1 = 36$

8. $x^2 + 8x + 16 = 4$

9. Explain why some problems had only one solution, or no solution.

Solving by Completing the Square

Solve each equation by first completing the square and then using the equal squares method. Show your work. *One problem is impossible.* (The solutions are not necessarily integers.)

1. $x^2 + 4x = 5$

2. $x^2 + 6x = 16$

3. $x^2 + 10x = -24$

4. $x^2 + 8x + 20 = 8$

5. $x^2 + 4x + 9 = 2$

6. $9x^2 + 6x - 3 = 0$

7. $2x^2 + 6x = 2 - 6x$

8. $x^2 + 12x + 26 = -3$