

Algebra 2 Honors

Completing the Square

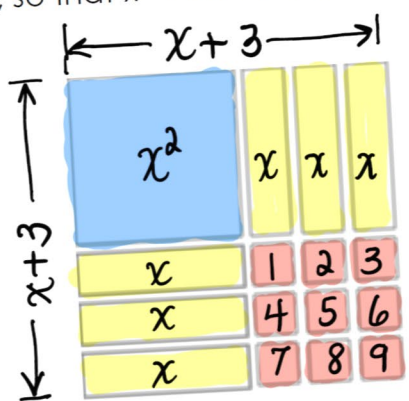
Lesson 6: Completing the Square



Completing the Square

The process of finding a constant c to add to $x^2 + bx$, so that $x^2 + bx + c$ is the square of a binomial.

A PHYSICAL MODEL FOR $(x + 3)^2$



Square Root Method for Solving Quadratics

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4.6

Lesson 6: Completing the Square

Completing the Square

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A PHYSICAL MODEL FOR $(x + 3)^2$



Square Root Method For Solving Quadratics

EX. Solve: $x^2 = 9$

Solving by Finding Square Roots

You can use the following steps to solve equations using the square root method.

1. Isolate the squared term on one side of the equation.
2. Take the square root of both sides.
3. Remember that every non-zero number has two square roots, use $\pm$ symbol.
4. Simplify completely.

EX #1: Solve. $2x^2 + 9 = 13$

EX #2: Solve. $7x^2 - 10 = 35$

Solving a Perfect Square Trinomial Equation

EX #3: Solve.

A. $x^2 - 14x + 49 = 25$

B. $x^2 + 10x + 25 = 100$

C. $4x^2 - 12x + 9 = 49$

Completing the Square

Create a perfect square trinomial from $1x^2 + bx$ by adding

EX #4: Find the value to complete the square for each expression.

A. $x^2 + 6x$

B. $x^2 - 14x$

C. $m^2 - 24m$

D. $d^2 + 5d$

Solving an Equation by Completing the Square

You can use the following steps to complete the square and solve equations using the square root property.

1. Divide each term by the leading coefficient if it is greater than 1.
2. Using the addition property, move the constant term to the other side of the equation, isolating it from the variable terms.
3. Using the coefficient on the linear term, take half of this number and square it.
4. Add the resulting value to both sides of the equation.
5. Factor the trinomial square to the form $(x + h)^2$.
6. Take the square root of both sides.
7. Solve the equation.
8. Simplify any radical expression completely.

EX #5: Solve. $x^2 - 12x + 7 = 0$

Completing the Square if $a > 1$

EX #6: Solve. $2x^2 + 2x - 9 = 0$

EX #7: Solve. $4x^2 + 10x - 3 = 0$

Writing in Vertex Form

EX #8: What is $y = x^2 - 6x + 3$ in vertex form?

EX #9: The lengths of the sides of a rectangular window have the ratio of 1.6 to 1. The area of the window is 2822.4 in². What are the window dimensions?

NOTES

Name _____ Date _____

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Completing the Square Practice

Problems 1 – 6, complete the square.

1. $x^2 - 8x + \square$

2. $x^2 - 12x + \square$

3. $m^2 + 7m + \square$

4. $x^2 + 5x + \square$

5. $w^2 - 9w + \square$

6. $y^2 + 18y + \square$

Problems 7 – 12, rewrite each equation in vertex form. Then find the vertex.

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

8. $y = 4x^2 + 8x - 4$

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

10. $y = -3x^2 + 3x - 1$

11. $y = 2x^2 + 20x + 50$

12. $y =$

Problems 13 – 22, solve each quadratic equation by completing the square.

13. $x^2 - 6x = 3$

14. $x^2 - 5x = 4$

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

16. $2x^2 = -8x + 14$

17. $2x^2 = 6x + 5$

18. $x^2 = 3x + 7$

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

20. $2x^2 = 8x$

Practice Sets

Lesson Warm-Ups

Name _____ Date _____ Period _____	
Lesson 4.6: Completing the Square Warm-Up #1	
1. Solve by completing the square. $x^2 + 2x - 3 = 0$	2. Solve by completing the square. $x^2 - 2x = 3$
3. Solve by completing the square. $x^2 + 13x + 22 = 7$	4. Solve by completing the square. $5x^2 + 19x - 68 = -2$

Name _____ Date _____	
Lesson 4.6: Completing the Square	
1. Solve by completing the square. $x^2 + 2x - 63 = 0$	2. Solve
3. Solve by completing the square. $x^2 - 9x - 38 = -9$	4. Solve

4.6 Completing the Square Form A	4.6 Completing the Square Form B
Name _____	Name _____
Date _____ Period _____	Date _____ Period _____
1. Solve. $x^2 - 10x + 25 = 49$	1. Solve. $x^2 + 8x + 16 = 36$
2. Complete the square, then solve. $x^2 - 6x + 2 = 0$	2. Complete the square, then solve. $x^2 - 10x + 8 = 0$
3. Find vertex form by completing the square. $y = x^2 - 8x + 5$	3. Find vertex form by completing the square. $y = x^2 - 12x + 7$

Daily Lesson Quiz

Grade: _____	Grade: _____
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