

I'm not robot!



### III. Challenge Problems

21. Solve  $x^4 - 18x^2 + 17 = 0$  over the set of Complex Numbers.
23. The vertex form of the equation of a parabola is  $y = a(x - h)^2 + k$ . Complete the square to rewrite  $y = x^2 + 4x + 5$  in vertex form.
25. Solve for  $x$  by completing the square.  
 $0 = ax^2 + bx + c$

Match your answer with a letter to learn the fun math fact!

- |   |                           |
|---|---------------------------|
| A. $x = 2$ and $-4$                     | M. $x = 2 \pm \sqrt{102}$ |
| E. $x = 11$ and $1$                     | U. $x = 2$ and $-6$       |
| L. $x = 6 \pm \sqrt{13}$                | R. $x = 3$ and $-1$       |
| G. $x = 1$ and $-15$                    | N. $x = 5$ and $-7$       |
| T. $x = 3$ and $-17$                    | I. $x = 5 \pm \sqrt{7}$   |
| Y. $x = \frac{3}{2}$ and $\frac{-7}{2}$ | S. $x = -7 \pm \sqrt{87}$ |
| B. $x = 9$ and $-1$                     | P. $x = 3$ and $1$        |
| V. $x = \frac{2}{3}$ and $\frac{-2}{7}$ |                           |

If you take your a g e, multiply it

by 7, then m u i t i p l y

by 1443, the product r e p e a t s

your a g e 3 times.

#### SOLVE QUADRATICS BY COMPLETING THE SQUARE

##### Section A – Solve giving your answers to one decimal place

- $x^2 + 10x - 4 = 0$
- $x^2 + 6x + 1 = 0$
- $x^2 + 4x - 10 = 0$
- $x^2 + 12x - 6 = 0$
- $x^2 - 12x + 30 = 0$
- $x^2 - 20x + 36 = 0$
- $x^2 + 7x - 4 = 0$
- $x^2 - 11x + 7 = 0$

##### Harder problems

- $2x^2 + 12x - 30 = 0$
- $2x^2 + 16x + 10 = 0$
- $5x^2 + 10x - 30 = 0$
- $3x^2 - 12x - 9 = 0$
- $12 + 6x - x^2 = 0$
- $7 - 12x - x^2 = 0$
- Explain why  $x^2 + 6x + 20 = 0$  has no solutions.
- Solve  $18x - 3x^2 = -24$

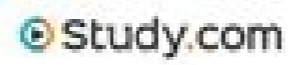
**Answer Key**  
Solve for x by completing the square.

$2x^2 + 14x + 24 = 0$	$12x^2 - 24x + 36 = 0$
$2x^2 + 14x = -24$	$12x^2 - 24x = -36$
$x^2 + 7x = -12$	$x^2 - 2x = -3$
$x^2 + 7x + \frac{49}{4} = -12 + \frac{49}{4}$	$x^2 - 2x + 1 = -4 + 1$
$(x + \frac{7}{2})^2 = -\frac{1}{4}$	$(x - 1)^2 = -4$
$x + \frac{7}{2} = \pm \sqrt{-\frac{1}{4}}$	$x - 1 = \pm 2$
$x + \frac{7}{2} = \frac{1}{2}$ $x + \frac{7}{2} = -\frac{1}{2}$	$x - 1 = 2$ $x - 1 = -2$
$x = -3$	$x = 3$ $x = -1$

$3x^2 + 8x + 6 = 0$	$2x^2 - 20x + 32 = 0$
$3x^2 + 8x = -6$	$2x^2 - 20x = -32$
$x^2 + \frac{8}{3}x = -2$	$x^2 - 10x = -16$
$x^2 + \frac{8}{3}x + \frac{16}{9} = -2 + \frac{16}{9}$	$x^2 - 10x + 25 = -9 + 25$
$(x + \frac{8}{3})^2 = -\frac{2}{9}$	$(x - 5)^2 = 16$
$x + \frac{8}{3} = \pm \sqrt{-\frac{2}{9}}$	$x - 5 = \pm 4$
$x + \frac{8}{3} = \frac{2}{3}$ $x + \frac{8}{3} = -\frac{2}{3}$	$x - 5 = 4$ $x - 5 = -4$
$x = -\frac{10}{3}$	$x = 9$ $x = 1$

<http://study.com/academy/practice/quiz-worksheet-practice-problems-for-completing-the-square.html>



## Quiz & Worksheet - Practice Problems for Completing the Square

1. Which equation below contains a trinomial that can be readily rewritten as a perfect square binomial?

- $y = x^2 - 9x + \frac{81}{4}$
- $y = x^2 - 9x + 81$
- $y = x^2 - 9x - 81$
- $y = x^2 + 10x + 20$
- $y = x^2 + 10x + \frac{25}{4}$

2. What would the first step be in completing the square of the following equation?  
 $y = 2x^2 + 4x + 12$

- Factor 2 out of each term in the trinomial.
- Add 7 to both sides of the equation.
- Add 55 to both sides of the equation.
- Factor the trinomial into a perfect square binomial.
- Subtract 55 from both sides of the equation.

3. Find the value for c that must be added to both sides, and rewrite the equation in the vertex form.

$$y = x^2 + 12x + 35$$

$$y - 35 + c = x^2 + 12x + c$$

- $y = (x + 6)^2 - 1$
- $y = (x - 6)^2 - 1$
- $y = (x - 6)^2 + 1$
- $y = (x + 6)^2 + 1$
- $y = (x + 12)^2$

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Problem 1 :Write  $x^2 + 6x + 7 = 0$  in the form  $(x + p)^2 = q$ . Problem 2 :Solve the following quadratic equation using square root:  $x^2 + 12x + 36 = 49$  Problem 3 :Solve the following quadratic equation by completing the square:  $x^2 - 8x - 9 = 0$  Problem 4 :Write the following quadratic equation in vertex form and graph it:  $y = -x^2 - 2x + 3$  What is the maximum or minimum value of the graph of the equation? Problem 5 :Alex plans to create rectangular shaped garden. He has 340 m of fencing available for the garden's perimeter and wants it to have an area of 6000 m<sup>2</sup>. What dimensions should Alex use? 1. Answer : Write the original equation.  $x^2 + 6x + 7 = 0$  can be written as  $(x + 3)^2 = 22$ . Answer : Write the original equation.  $x^2 + 12x + 36 = 49$  Recognize that the quadratic equation is a perfect square trinomial.  $x^2 + 2(6)(x) + 6^2 = 49$  Factor the perfect square trinomial.  $(x + 6)^2 = 49$  Take the square root on each side of the equation.  $\sqrt{(x + 6)^2} = \pm \sqrt{49}$   $x + 6 = \pm 7$  or  $x + 6 = 7$  or  $x + 6 = -7$  or  $x = 1$  or  $x = 13$ . Answer : Write the original equation.  $x^2 - 8x - 9 = 0$  Isolate the variable expression.  $x^2 - 8x = 9$  ----(1) Determine the constant needed to complete the square. Comparing  $x^2 + bx$  and  $x^2 - 8x$ , we get  $b = -8$ . So,  $(b/2)^2 = (-8/2)^2 = (-4)^2 = 16$  In (1), we have to add 16 to each side.  $x^2 - 8x + 16 = 9 + 16$   $x^2 - 8x + 16 = 25$  Write the left side of the equation as a perfect square.  $(x - 4)^2 = 25$  Take the square root on each side of the equation.  $\sqrt{(x - 4)^2} = \pm \sqrt{25}$   $x - 4 = \pm 5$  or  $x - 4 = 5$  or  $x - 4 = -5$  or  $x = 9$  or  $x = -1$  or  $x = 9$ . Answer : Write the original equation.  $y = -x^2 - 2x + 3$  Factor out the  $x^2$  coefficient.  $-1 \cdot y = -1(x^2 + 2x + 3) = -1(x^2 - 2 \cdot x \cdot 1 + 3) = -1(x^2 - 2 \cdot x \cdot 1 - 3) = -1(x^2 - 2 \cdot x \cdot 1 + 1 - 1 - 3) = -1(x^2 - 2 \cdot x \cdot 1 + 1 + 12 - 12 - 3) = -1(x - 1)^2 - 12 - 3 = -1(x - 1)^2 - 15 = -(x - 1)^2 - 15$  Hence, the vertex form of the equation is  $y = -(x - 1)^2 - 15$ . Vertex : The vertex of the parabola is (1, -15). Graph : In the given equation  $y = -x^2 - 2x + 3$ , the sign of  $x^2$  is negative. So, its graph is a parabola that opens down. The graph of the given quadratic equation has a maximum of  $y = 4$  at  $x = 1.5$ . Answer : Let  $x$  and  $y$  be the length and width of the garden respectively. Given : Perimeter = 340. So, we have  $2x + 2y = 340$  Divide each side by 2.  $x + y = 170$  So,  $y = 170 - x$  Alex wants the area to be 6000 m<sup>2</sup>. Write this as an equation.  $A = xy$   $6000 = x(170 - x)$   $6000 = 170x - x^2$   $x^2 - 170x + 6000 = 0$  ----(1) Determine the constant needed to complete the square. Comparing  $x^2 + bx$  and  $x^2 - 170x$ , we get  $b = -170$ . So,  $(b/2)^2 = (-170/2)^2 = (-85)^2 = 7225$  In (1), we have to add 7225 to each side.  $x^2 - 170x + 7225 = -6000 + 7225$  Write the left side of the equation as a perfect square.  $(x - 85)^2 = 1225$  Take the square root on each side of the equation.  $\sqrt{(x - 85)^2} = \pm \sqrt{1225}$   $x - 85 = \pm 35$  or  $x - 85 = 35$  or  $x - 85 = -35$  or  $x = 120$  or  $x = 50$ . When  $x = 50$ ,  $y = 170 - 50 = 120$ . When  $x = 120$ ,  $y = 170 - 120 = 50$ . In each case, there is 340 m of fencing used. Likewise, the area is 6000 m<sup>2</sup>. Hence, Alex should make two sides of the garden 120 m long and the other two sides 50 m long. Kindly mail your feedback to [v4formath@gmail.com](mailto:v4formath@gmail.com) We always appreciate your feedback. ©All rights reserved. [onlinemath4all.com](http://onlinemath4all.com) Solving quadratics via completing the square can be tricky, first we need to write the quadratic in the form  $(x + \text{color{red}}\{d\})^2 + \text{color{blue}}\{e\}$  then we can solve it. Since  $a = 1$ , this can be done in 4 easy steps. Example: By completing the square, solve the following quadratic  $x^2 + 6x + 3 = 1$  Step 1: Rearrange the equation so it is  $= 0$   $\begin{aligned} & (x + 3)^2 - 6 + 3 = 1 \\ & (x + 3)^2 - 3 = 1 \\ & (x + 3)^2 = 4 \end{aligned}$  Step 2: Half the coefficient of  $x$ , so in this case  $\text{color{red}}\{d\} = 6 \div 2 = \text{color{red}}\{3\}$ , and add it in the place of  $\text{color{red}}\{d\} (x + \text{color{red}}\{3\})^2 + \text{color{blue}}\{e\}$  Step 3: Next we need to find  $\text{color{blue}}\{e\}$  which equals the constant at the end of the quadratic,  $+2$ , minus  $\text{color{red}}\{d\}^2$ , then replace  $\text{color{blue}}\{e\}$  in the equation  $(\text{color{blue}}\{e\} + \text{color{black}}\{c\}) \text{color{red}}\{d\} (\text{color{black}}\{^2\})$  as  $\text{color{black}}\{a = 1\}$ .  $\begin{aligned} & (x + \text{color{red}}\{3\})^2 - 3 = 1 \\ & (x + \text{color{red}}\{3\})^2 = 4 \end{aligned}$  Step 4: Now we have the equation in this form we can solve the equation.  $\begin{aligned} & (x + 3)^2 = 4 \\ & (x + 3) = \pm \sqrt{4} \\ & x + 3 = \pm 2 \end{aligned}$  This gives the solutions to be  $\sqrt{4} = 2$  and  $-\sqrt{4} = -2$  Remember: A square root can have both a positive and negative solution Level 8-9 If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains [\\*.kastatic.org](http://*.kastatic.org) and [\\*.khanacademy.org](http://*.khanacademy.org) are unblocked. 50 Completing The Square Practice Worksheet In 2020 With Images Nov 17, 2020 completing the square practice worksheet 50 completing the square practice worksheet , solving equations by factoring worksheet. Get students moving with this activity, which includes a total of 24 task cards. students will practice the following concepts. solving quadratic equations by: 1. using square roots (6 cards) 2. completing the square (6 cards) 3. using the quadratic formula (6 cards) 4. choosing any method (. By algebra activities made fun. 4.9. (30) \$3.00. pdf. completing the square worksheet: this activity allows student to practice solving 12 quadratic equations by completing the square. most problems a = 1 but there are some in which a is not 1. the students then use their answers to solve the math fun fact!. Solve for x by completing the square. on this final example, follow the complete the square formula 3 step method for finding the solutions\* as follows: \*note that this problem will have imaginary solutions. step 1 3: move the constants to the right side. step 2 3: add (b/2)^2 to both sides. step 3 3: factor and solve. It is called completing the square. here's how it works. for the polynomial  $x^2 + bx + c$  (note here that the coefficient on  $x^2$  is 1) we can complete the square by: find the value of  $b/2$ . square this value to obtain  $(b/2)^2$ . set this value as  $c$ . you will obtain a perfect square trinomial that can be factored as  $(x + b/2)^2 + c$ . Completing The Square Practice Worksheet Lovely Pleting The Square To complete the square, you divide the number with the "x" by two and then square that number to find the last term. 12 divided by two is 6, and 6 squared is 36, so  $c = 36$ . this time, 5 divided by 2 is 2.5 and 2.5 squared is 6.25. Completing the square. some quadratic expressions can be factored as perfect squares. for example,  $x^2 + 6x + 9 = (x + 3)^2$ ; however, even if an expression isn't a perfect square, we can turn it into one by adding a constant number. for example,  $x^2 + 6x + 5$  isn't a perfect square, but if we add 4 we get  $(x + 3)^2$ ; this, in essence, is the method of. Completing the square with leading coefficients greater than 1 worksheet example) practice problems: 1)  $x = 2$  2)  $x = 3$  end of preview. want to read all 2 pages? Completing The Square Method And Solving Quadratic Equations Algebra 2 this algebra 2 video tutorial shows you how to complete the square to solve quadratic equations. this video is for high school objective: to solve quadratic equations by completing the square. learn how to solve quadratic equations by completing the square. when solving a quadratic equation by completing the square, homeschoolmathquiz homeschoolmathquiz free way to give your homeschooler math pop quizzes. we are given this quadratic expression  $x^2 + 6x + 4$  and we have to convert it into one of the given choices. we can use the mit grad shows the easiest way to complete the square to solve a quadratic equation. to skip ahead: 1) for a quadratic that hi all, i personally really enjoyed learning completing the square, especially understanding how the process works. this video is completing the square can be rough, but this film is a no thinking approach to completing the square. if you follow this tutorial the this video screencast was created with doceri on an ipad. doceri is free in the itunes app store. learn more at mathpowerline schedule a free live math session with terry vannoy, founder of the mathpowerline web site i regularly upload resources that i have created during 30 years as a teacher. 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