**9.5 Solving Quadratic Equations by Completing the Square**

Warm-up: Solve.

Can you fill in the blanks to make each quadratic below a perfect square?

To complete the square of a quadratic function of the form

1. Divide a, b, and c term by a so that the leading coefficient is 1:
2. Bring ‘c’ to the other side of the equation, so the quadratic equation is of the form:
3. Find one half of ‘b’
4. Square (the value you found in step 2)
5. Add to both sides (the value you found in step 3)
6. Factor the perfect square trinomial
7. Solve by taking the square root

Solve by completing the square

Your turn.



Complete the square when

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YOU TRY:

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| **E.** 2*c*2 + 7*c* +3 = 0 | **F.** 3*f*2 – 2*f =* 1 | **G.** 9*x*2 – 42*x* +49 = 0 |

Name

Class

Date

9-5

**Practice**



Completing the Square

*Form G*

**Find the value of *c* such that each expression is a perfect-square trinomial.**

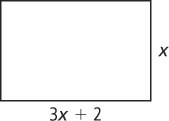
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| --- | --- | --- |
| **1.** *x*2 + 4*x* + *c* | **2.** *b*2 + 12*b* + *c* | **3.** *g*2 – 20*g* + *c* |
| **4.** *a*2 – 7*a* + *c* | **5.** *w*2 + 18*w* + *c* | **6.** *n*2 – 9*n* + *c* |

**Solve each equation by completing the square. If necessary, round to the nearest hundredth.**

|  |  |  |
| --- | --- | --- |
| **7.** *z*2 – 19*z =* 66 | **8.** *p*2 – 5*p =* –4 | **9.** *b*2 + 6*b =* 16 |
| **10.** *c*2 – 4*c =* 21 | **11.** *a*2 – 2*a =* 15 | **12.** *v*2 + 8*v =* 15 |
| **13.** *y*2 + 16*y =* 17 | **14.** *x*2 + 4*x* +3 = 0 | **15.** *h*2 + 4*h =* 1 |
| **16.** *r*2 + 8*r* +13 = 0 | **17.** *d*2 – 2*d –* 4 = 0 | **18.** *m*2 – 24*m* +44 = 0 |

**Solve each equation by completing the square. If necessary, round to the nearest hundredth.**

|  |  |  |
| --- | --- | --- |
| **19.** 3*y*2 + 5*y =* 12 | **20.** 2*h*2 – 5*h =* –1 | **21.** 4*k*2 + 4*k =* 5 |
| **22.** 2*c*2 + 7*c* +3 = 0 | **23.** 3*f*2 – 2*f =* 1 | **24.** 9*x*2 – 42*x* +49 = 0 |

**25.** The rectangle shown at the right has an area of 56 *m*2. What is the value of *x*?