

U2 Day 9 HW – Completing the Square

Complete the square.

1. $x^2 + 6x + 9$

2. $x^2 - 7x + \frac{49}{4}$

3. $x^2 + 12x + 36$

4. $x^2 + 3x + \frac{9}{4}$

5. $x^2 - 8x + 16$

6. $x^2 + 16x + 64$

7. $x^2 + 21x + \frac{441}{4}$

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

Complete the square to solve the quadratic equation.

<p>9. $x^2 + 12x + 4 = 0$</p> $x^2 + 12x + 36 = -4 + 36$ $(x+6)^2 = 32$ $x+6 = \pm 4\sqrt{2}$ $x = -6 \pm 4\sqrt{2}$	<p>10. $2x^2 = -2x + 5$</p> $\frac{2x^2 + 2x}{2} = \frac{5}{2}$ $x^2 + x + \frac{1}{4} = \frac{5}{2} + \frac{1}{4}$ $(x + \frac{1}{2})^2 = \frac{11}{4}$ $x + \frac{1}{2} = \pm \frac{1}{2}\sqrt{11} \quad x = \frac{-1 \pm \sqrt{11}}{2}$	<p>11. $x^2 = 3x$</p> $x^2 - 3x + \frac{9}{4} = \frac{9}{4}$ $(x - \frac{3}{2})^2 = \pm \frac{3}{2}$ $x = \frac{3}{2} \pm \frac{3}{2}$ $= 3, 0$
<p>12. $2x^2 = 4x - 5$</p> $2x^2 - 4x = -5$ $x^2 - 2x + 1 = -\frac{5}{2} + 1$ $(x-1)^2 = -\frac{3}{2}$ $x-1 = \pm \frac{\sqrt{6}}{2}$ $x = \frac{2 \pm \sqrt{6}}{2}$	<p>13. $x^2 = -3x + 2$</p> $x^2 + 3x + \frac{9}{4} = 2 + \frac{9}{4}$ $(x + \frac{3}{2})^2 = \frac{17}{4}$ $x + \frac{3}{2} = \pm \frac{\sqrt{17}}{2}$ $x = \frac{-3 \pm \sqrt{17}}{2}$	<p>14. $x^2 = 7x + 12$</p> $x^2 - 7x + \frac{49}{4} = 12 + \frac{49}{4}$ $(x - \frac{7}{2})^2 = \frac{97}{4}$ $x - \frac{7}{2} = \pm \frac{\sqrt{97}}{2}$ $x = \frac{7 \pm \sqrt{97}}{2}$

Complete the square to find the vertex:

<p>15. $y = x^2 + 3x + 3$</p> $y-3 = x^2 + 3x$ $y - \frac{12}{4} + \frac{9}{4} = x^2 + 3x + \frac{9}{4}$ $y - \frac{3}{4} = (x + \frac{3}{2})^2$ $y = (x + \frac{3}{2})^2 + \frac{3}{4}$ <p>Vertex: $-\frac{3}{2}, \frac{3}{4}$</p>	<p>16. $y = 2x^2 + x - 1$</p> $y+1 = 2x^2 + x$ $\frac{y+1}{2} = x^2 + \frac{1}{2}x$ $\frac{y+1}{2} + \frac{1}{16} = x^2 + \frac{1}{2}x + \frac{1}{16}$ $\frac{y+1}{2} = (x + \frac{1}{4})^2 - \frac{1}{16}$ $y+1 = 2(x + \frac{1}{4})^2 - \frac{1}{8}$ <p>Vertex: $(-\frac{1}{4}, -\frac{9}{8})$</p>	<p>17. $y = 2x^2 - 4x + 3$</p> $y-3 = 2x^2 - 4x$ $\frac{y-3}{2} + 1 = x^2 - 2x + 1$ $\frac{y-3}{2} = (x-1)^2 - 1$ $y-3 = 2(x-1)^2 - 2$ $y = 2(x-1)^2 + 1$ <p>Vertex: $(1, 1)$</p>
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<p>18. $y = x^2 - x + 1$</p> $y-1 = x^2 - x$ $y-1 + \frac{1}{4} = x^2 - x + \frac{1}{4}$ $y - \frac{3}{4} = (x - \frac{1}{2})^2$ $y = (x - \frac{1}{2})^2 + \frac{3}{4}$ <p>Vertex: $(\frac{1}{2}, \frac{3}{4})$</p>	<p>To complete the square, a must be equal to <u>1</u>.</p> <p>If it is not, you must <u>divide by #</u></p>	<p>Completing the square is (easier, harder) than using the quadratic formula.</p>
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Answer Bank

$\frac{-3 \pm \sqrt{17}}{2}$	$\frac{7 \pm \sqrt{97}}{2}$	$(-\frac{1}{2}, \frac{3}{4})$	$\frac{-1 \pm \sqrt{11}}{2}$	$(\frac{-3}{2}, \frac{-3}{4})$	$-6 \pm 4\sqrt{2}$	$0, 3$	$(1, -5)$	$(-\frac{1}{4}, -\frac{9}{8})$	$\frac{2 \pm \sqrt{6}}{2}$
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$$y = 2(x + \frac{1}{4})^2 - \frac{9}{8}$$