

Name:

Date:

1. $x = 1 \pm \sqrt{3}$

2. $x = -2 \pm \sqrt{10}$

3. $x = 2 \pm \sqrt{17}$

4. $x = -3 \pm 4\sqrt{2}$

5.

$$\begin{aligned} x^2 - 5x - 5 &= 0 \\ x^2 - 5x &= 5 \\ x^2 - 5x + \frac{25}{4} &= 5 + \frac{25}{4} \\ \left(x - \frac{5}{2}\right)^2 &= \frac{45}{4} \\ x - \frac{5}{2} &= \pm \frac{3\sqrt{5}}{2} \\ x &= \frac{5}{2} \pm \frac{3\sqrt{5}}{2} \end{aligned}$$

$$x = \frac{5 \pm 3\sqrt{5}}{2}$$

6. $x = \frac{-3 \pm \sqrt{5}}{2}$

7.

$$\begin{aligned} 3x^2 + 5x - 8 &= 0 \\ 3x^2 + 5x &= 8 \\ x^2 + \frac{5}{3}x &= \frac{8}{3} \\ x^2 + \frac{5}{3}x + \frac{25}{36} &= \frac{8}{3} + \frac{25}{36} \\ \left(x + \frac{5}{6}\right)^2 &= \frac{121}{36} \\ x + \frac{5}{6} &= \pm \frac{11}{6} \\ x &= -\frac{5}{6} \pm \frac{11}{6} \end{aligned}$$

$x = \frac{11}{6} - \frac{5}{6}$ or $-\frac{11}{6} - \frac{5}{6}$. So $x = 1, -\frac{8}{3}$

8. $x = \frac{4 \pm \sqrt{6}}{2}$



Math Olympiad and Problem Solving Programs
E120 - Honors Algebra Problem Solving
Problem Set 18.1 - Completing the Square

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9. $x = \frac{2 \pm \sqrt{19}}{3}$

10. $x = -3, -7$