

In class practice: solving systems algebraically using substitution and elimination

For numbers 1-6, solve by substitution.

<p>1. $y = 2x - 6$ $(2, -2)$ $3x + 2y = 2$ $3x + 2(2x - 6) = 2$ $7x = 14$ $x = 2$</p>	<p>2. $y = 3x - 2$ <i>No solution</i> $y = 3x + 22$ $3x - 2 = 3x + 22$ $-2 = 22$</p>	<p>3. $y = -2x - 5$ $(\frac{4}{5}, -\frac{33}{5})$ $3x - y = 9$ $3x - (-2x - 5) = 9$ $5x = 4$ $x = \frac{4}{5}$</p>
<p>4. $y = 6x + 2$ <i>No solution</i> $3x - \frac{1}{2}y = 1$ $3x - \frac{1}{2}(6x + 2) = 1$ $3x - 3x - 1 = 1$ $-1 = 1$</p>	<p>5. $y = x^2$ $(3, 9)$ $y = 2x + 3$ $(-1, 1)$ $x^2 = 2x + 3$ $x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $x = 3, -1$</p>	<p>6. $x^2 + y^2 = 20$ $(4, -2)$ $x + y = 2 \Rightarrow y = 2 - x$ $(-2, 4)$ $x^2 + 4 - 4x + x^2 = 20$ $2x^2 - 4x - 16 = 0$ $2(x - 2x - 8) = 0$ $2(x - 4)(x + 2) = 0$ $x = 4, -2$</p>

For #'s 7-15, solve by elimination

<p>7. $x - 2y = -6$ $(-1, 5/2)$ $3x + 2y = 2$ $4x = -4$ $x = -1$ $-3 + 2y = 2$ $2y = 5$ $y = 5/2$</p>	<p>8. $x + 2y = -2$ $(6, -4)$ $5x + 2y = 22$ $-x - 2y = 2$ $4x = 24$ $x = 6$ $6 + 2y = -2$ $2y = -8$ $y = -4$</p>	<p>9. $-3x + y = -5$ <i>No solution</i> $3x - y = 9$ $0 = 4$</p>
<p>10. $2x + y = 2$ $(\frac{1}{2}, 1)$ $2(3x - \frac{1}{2}y = 1)$ $2x + y = 2$ $6x - y = 2$ $8x = 4$ $x = 1/2$</p>	<p>11. $x + 2y = 3$ <i>Infinite solutions</i> $2x + 4y = 6$ $-2x - 4y = -6$ $0 = 0$</p>	<p>12. $3(2x + 3y = -3)$ $(-30, 19)$ $2(3x + 5y = 5)$ $-6x - 9y = 9$ $6x + 10y = 10$ $y = 19$ $2x + 57 = -3$ $2x = -60$ $x = -30$</p>
<p>13. $2x^2 + y^2 = 6$ <i>No solution</i> $-(x^2 + y^2 = 2)$ $x^2 = 4$ $x = \pm 2$ $4 + y^2 = 2$ $y^2 = -2$ $y = i\sqrt{2}$</p>	<p>14. $5(2x + 4y = 7)$ $(\frac{-17}{6}, \frac{19}{6})$ $-1(7x + 5y = -4)$ $10x + 20y = 35$ $-28x - 20y = 16$ $-18x = 51$ $x = -\frac{51}{18} = -\frac{17}{6}$ $-\frac{17}{6} + 4y = 7$ $4y = \frac{49}{6}$ $y = \frac{19}{6}$</p>	<p>15. $4(-3x + 3y = -1)$ $(\frac{20}{27}, \frac{11}{27})$ $3(4x + 5y = 5)$ $-12x + 12y = -4$ $12x + 15y = 15$ $27y = 11$ $y = \frac{11}{27}$ $-3x + \frac{11}{9} = -1$ $-3x = -\frac{20}{9}$ $x = \frac{20}{27}$</p>

Put each in standard form. Determine the center and the radius.

<p>16. $x^2 + y^2 - 4x = 32$ $x^2 - 4x + 4 + y^2 = 32 + 4$ $(x - 2)^2 + y^2 = 36$ $(2, 0) \quad r = 6$</p>	<p>17. $x^2 + y^2 - 8x + 6y - 3 = -2$ $x^2 - 8x + 16 + y^2 + 6y + 9 = 1 + 16 + 9$ $(x - 4)^2 + (y + 3)^2 = 26$ $(4, -3) \quad r = \sqrt{26}$</p>	<p>18. $2x^2 + 2y^2 - 8x + 12y + 5 = 0$ $2(x^2 - 4x + 4) + 2(y^2 + 6y + 9) = -5 + 8 + 18$ $(x - 2)^2 + (y + 3)^2 = \frac{21}{2}$ $(2, -3) \quad r = \frac{\sqrt{21} \cdot \sqrt{2}}{\sqrt{2} \sqrt{2}} = \frac{\sqrt{42}}{2}$</p>
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