

A2.A.3: Quadratic-Linear Systems 1: Solve systems of equations involving one linear equation and one quadratic equation algebraically

- 1 Which values of x are in the solution set of the following system of equations? $y = 3x - 6$

$$y = x^2 - x - 6$$

- 1) $0, -4$
- 2) $0, 4$
- 3) $6, -2$
- 4) $-6, 2$

- 2 Determine algebraically the x -coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.

- 3 Solve the following systems of equations algebraically: $5 = y - x$

$$4x^2 = -17x + y + 4$$

- 4 What is the total number of points of intersection in the graphs of the equations $x^2 + y^2 = 16$ and $y = 4$?

- 1) 1
- 2) 2
- 3) 3
- 4) 0

- 5 The graphs of the equations $x^2 + y^2 = 4$ and $y = x$ are drawn on the same set of axes. What is the total number of points of intersection?

- 1) 1
- 2) 2
- 3) 3
- 4) 0

- 6 What is the total number of points of intersection of the graphs of the equations $x^2 + y^2 = 16$ and $y = x$?

- 1) 1
- 2) 2
- 3) 3
- 4) 4

- 7 What is the total number of points of intersection of the graphs of the equations $2x^2 - y^2 = 8$ and $y = x + 2$?

- 1) 1
- 2) 2
- 3) 3
- 4) 0

- 8 Which ordered pair is in the solution set of the system of equations shown below?

$$y^2 - x^2 + 32 = 0$$

$$3y - x = 0$$

- 1) $(2, 6)$
- 2) $(3, 1)$
- 3) $(-1, -3)$
- 4) $(-6, -2)$

- 9 Which ordered pair is a solution of the system of equations shown below? $x + y = 5$

$$(x + 3)^2 + (y - 3)^2 = 53$$

- 1) $(2, 3)$
- 2) $(5, 0)$
- 3) $(-5, 10)$
- 4) $(-4, 9)$

- 10 Solve: $x^2 + y^2 = 5$

$$x + y = 3$$

- 11 Solve: $x^2 + y^2 = 17$

$$x + y = 5$$

- 12 Solve: $x + y = 1$

$$x^2 + y^2 = 61$$

- 13 Solve $\begin{cases} x^2 - y^2 = 144 \\ x - y = 8 \end{cases}$

- 14 Solve the following system of equations algebraically: $9x^2 + y^2 = 9$

$$3x - y = 3$$

- 15 Solve the following systems of equations algebraically: $x^2 - 2y^2 = 23$

$$x - 2y = 7$$

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Answer Section

1 ANS: 2

$$x^2 - x - 6 = 3x - 6$$

$$x^2 - 4x = 0$$

$$x(x - 4) = 0$$

$$x = 0, 4$$

REF: 081015a2

2 ANS:

$$x(x + 3) = 10$$

$$x^2 + 3x - 10 = 0$$

$$(x + 5)(x - 2) = 0$$

$$x = -5, 2$$

REF: 011431a2

3 ANS:

$$\left(-\frac{9}{2}, \frac{1}{2}\right) \text{ and } \left(\frac{1}{2}, \frac{11}{2}\right). \quad y = x + 5 \quad . \quad 4x^2 + 17x - 4 = x + 5$$

$$y = 4x^2 + 17x - 4 \quad 4x^2 + 16x - 9 = 0$$

$$(2x + 9)(2x - 1) = 0$$

$$x = -\frac{9}{2} \text{ and } x = \frac{1}{2}$$

$$y = -\frac{9}{2} + 5 = \frac{1}{2} \text{ and } y = \frac{1}{2} + 5 = \frac{11}{2}$$

REF: 061139a2

4 ANS: 1 REF: 060119a

5 ANS: 2 REF: 010920a

6 ANS: 2 REF: 080625a

7 ANS: 2

$$2x^2 - (x + 2)^2 = 8$$

$$2x^2 - (x^2 + 4x + 4) - 8 = 0$$

$$x^2 - 4x - 12 = 0$$

$$(x - 6)(x + 2) = 0$$

$$x = 6, -2$$

REF: 011609a2

8 ANS: 4

$$x = 2y. \quad y^2 - (3y)^2 + 32 = 0 \quad . \quad x = 3(-2) = -6$$

$$y^2 - 9y^2 = -32$$

$$-8y^2 = -32$$

$$y^2 = 4$$

$$y = \pm 2$$

REF: 061312a2

9 ANS: 3

$$x + y = 5 \quad . \quad -5 + y = 5$$

$$y = -x + 5 \quad y = 10$$

$$(x + 3)^2 + (-x + 5 - 3)^2 = 53$$

$$x^2 + 6x + 9 + x^2 - 4x + 4 = 53$$

$$2x^2 + 2x - 40 = 0$$

$$x^2 + x - 20 = 0$$

$$(x + 5)(x - 4) = 0$$

$$x = -5, 4$$

REF: 011302a2

10 ANS:

(2,1) and (1,2)

REF: 119409a1

11 ANS:

(4,1) and (1,4)

REF: 089605a1

12 ANS:

(6,-5) and (-5,6)

REF: 010015a1

13 ANS:

(13,5)

REF: 010604a1

14 ANS:

(0,-3) and (1,0)

REF: 060627b

15 ANS:

$$(-19, -13), (5, -1). \quad x = 2y + 7. \quad (2y + 7)^2 - 2y^2 = 23 \quad . \quad x = 2y + 7 = 2(-13) + 7 = -19.$$

$$4y^2 + y + 14y + 14y + 49 - 2y^2 = 23$$

$$2y^2 + 28y + 26 = 0$$

$$y^2 + 14y + 13 = 0$$

$$(y + 13)(y + 1) = 0$$

$$y = -13, -1$$

$$x = 2y + 7 = 2(-1) + 7 = 5$$

REF: 061032b