G.GPE.A.3: Other Systems

1 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) $(-6,-2)$

2 Which ordered pair is a solution to the system below?

$$x^2 - 4y^2 = 16$$

$$y = x - 4$$

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

3 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

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

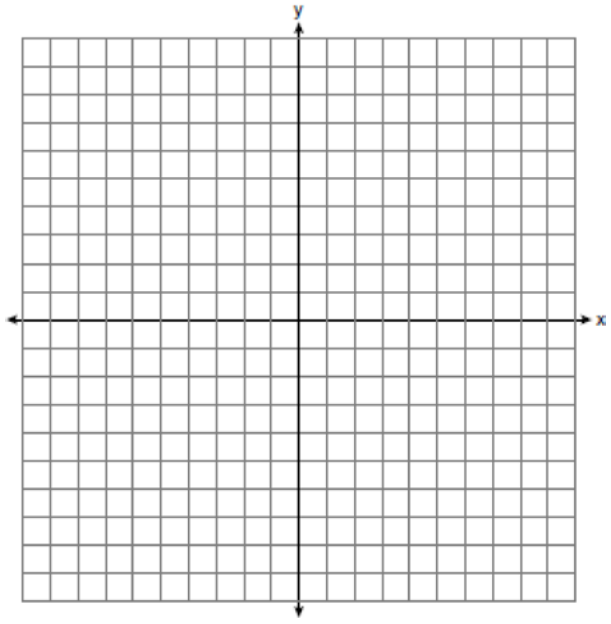
$$3x - y = 3$$

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

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

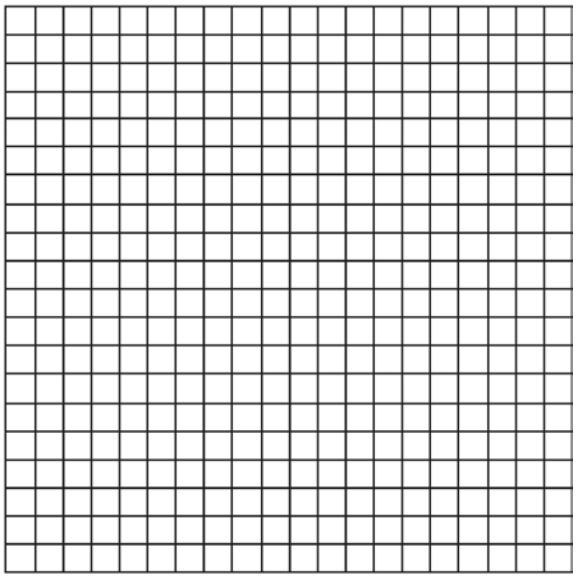
$$x - 2y = 7$$

7 On the accompanying set of axes, graph the parabola whose equation is $y = x^2 - 2x - 8$ over the interval $-3 \le x \le 5$ and graph the circle whose center is at $(1,-5)$ and whose radius is 4. Using your graphs, determine how many points of intersection the two graphs have.



Name: _____

8 Two circles whose equations are $(x-3)^2+(y-5)^2=25$ and $(x-7)^2+(y-5)^2=9$ intersect in two points. What is the equation of the line passing through these two points? [The use of the accompanying grid is optional.]

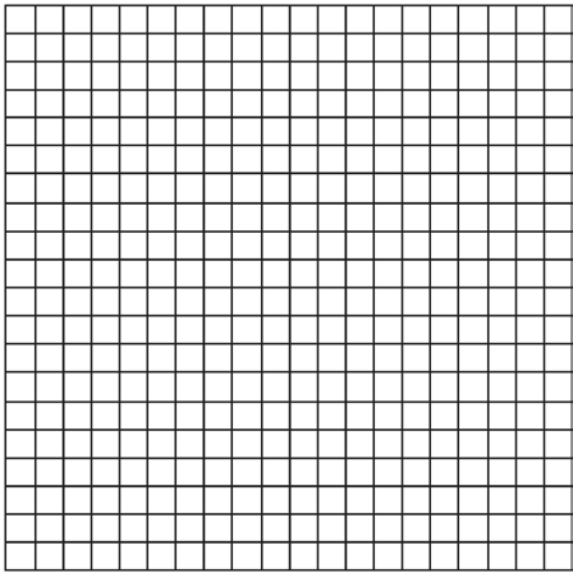


9 On the accompanying grid, graph the following system of equations over the interval $-6 \le x \le 6$.

$$x^2+y^2=25$$

$$xy=12$$

State the points of intersection.



G.GPE.A.3: Other Systems
Answer Section

1 ANS: 4

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

$$y^2 - 9y^2 = -32$$
$$-8y^2 = -32$$
$$y^2 = 4$$
$$y = \pm 2$$

REF: 061312a2

2 ANS: 2

$$x^2 - 4(x-4)^2 = 16 \qquad y = (4) - 4 = 0$$
$$x^2 - 4(x^2 - 8x + 16) = 16 \qquad y = \left(\frac{20}{3}\right) - 4 = \frac{8}{3}$$
$$x^2 - 4x^2 + 32x - 64 = 16$$
$$3x^2 - 32x + 80 = 0$$
$$(3x - 20)(x - 4) = 0$$
$$x = 4, \frac{20}{3}$$

REF: 011704a2

3 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

4 ANS:

$(0,-3)$ and $(1,0)$. $y = 3x - 3$.

$$\begin{aligned} 9x^2 + (3x-3)^2 &= 9 \\ 9x^2 + 9x^2 - 18x + 9 &= 9 \\ 18x^2 - 18x &= 0 \\ x^2 - x &= 0 \\ x(x-1) &= 0 \\ x = 0 \text{ and } x &= 1 \end{aligned}$$

. $y = 3x - 3$ $y = 3(0) - 3$. $y = -3$ $y = 3x - 3$ $y = 3(1) - 3$ $y = 0$

REF: 060627b

5 ANS:
$(13,5)$

REF: 010604al

6 ANS:

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

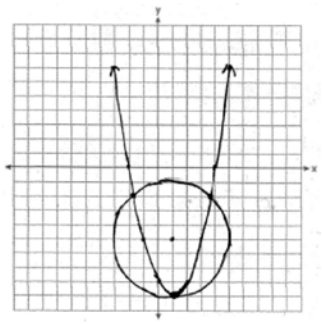
$$\begin{aligned} 4y^2 + y + 14y + 14y + 49 - 2y^2 &= 23 \\ 2y^2 + 28y + 26 &= 0 \\ y^2 + 14y + 13 &= 0 \\ (y+13)(y+1) &= 0 \\ y &= -13, -1 \end{aligned}$$

. $x = 2y + 7 = 2(-13) + 7 = -19$.

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

REF: 061032b

7 ANS:



3

REF: 010839a

8 ANS:

$(x-3)^2-25=-(y-5)^2$

$(x-7)^2-9=-(y-5)^2$ $\qquad (7-7)^2+(y-5)^2=9$

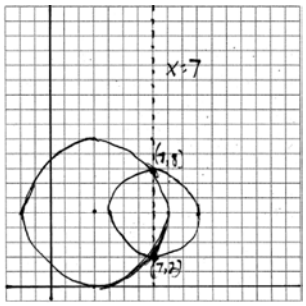
$(y-5)^2=9$

$x=7$. $(x-3)^2-25=(x-7)^2-9$ $\qquad y-5=\pm 3$. The line $x=7$ goes through the

$x^2-6x+9-25=x^2-14x+49-9$ $\qquad y=5\pm 3$

$8x=56$ $\qquad y=8$ and 2

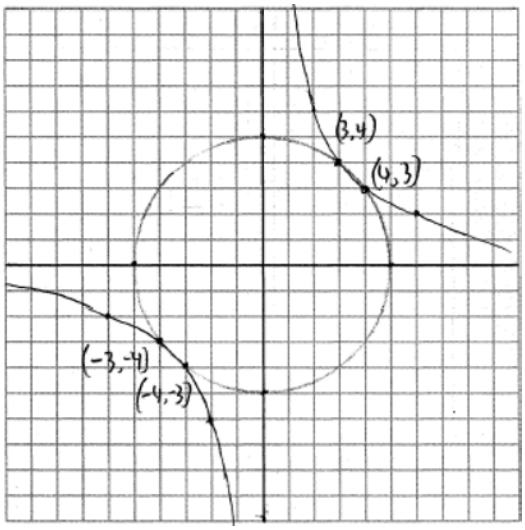
$x=7$



points of intersection, (7,2) and (7,8).

REF: 080732b

9 ANS:



(3,4),(4,3),(–3,–4),(–4,–3)

REF: 010932b