Systems of Conics WS 1
A Circle and A Line

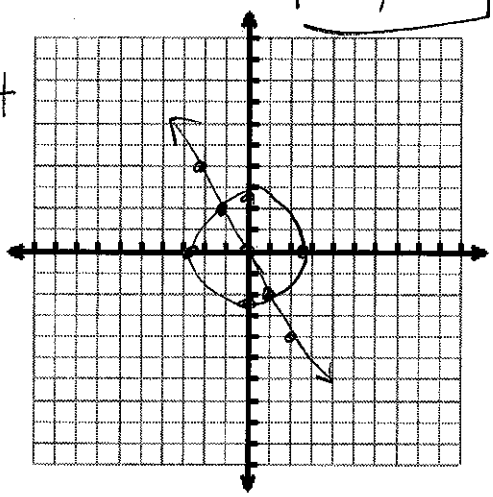
Name Key

Solve the system graphically. Find the points of intersection, if any.

1. $x^2 + y^2 = 5$
$y = -2x + 0$

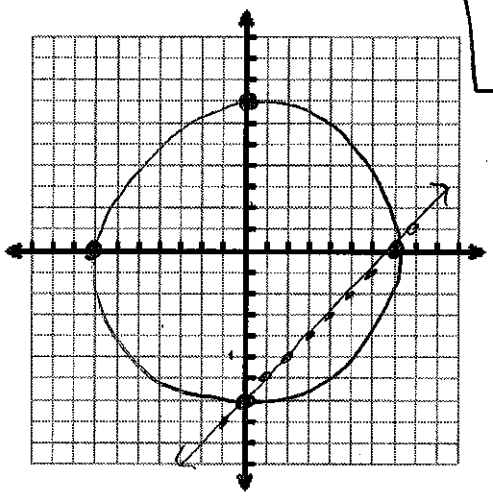
(1, 2)
(1, -2)

$r = \sqrt{5} \approx 2.24$



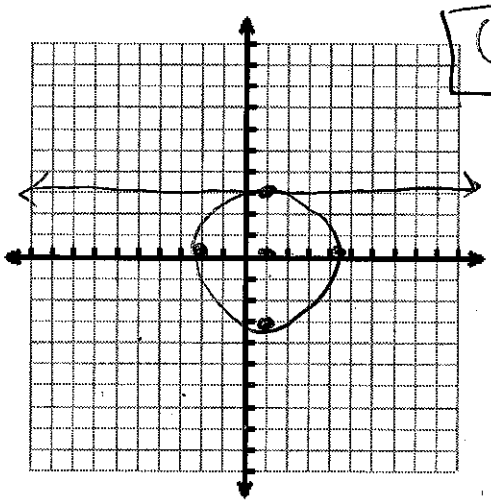
2. $x^2 + y^2 = 49$ $r = 7$
$y = x - 7$

(0, -7)
(7, 0)



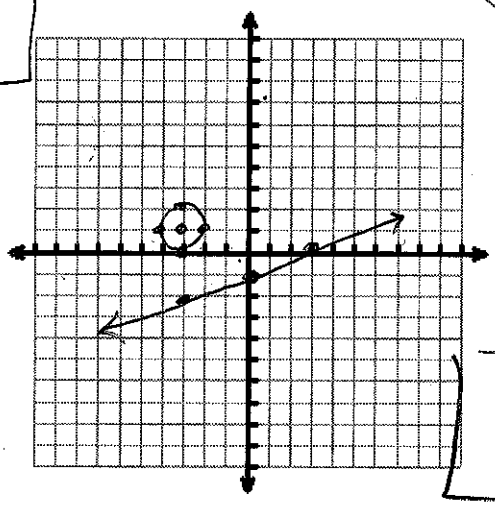
3. $(x-1)^2 + y^2 = 9$ C: (1, 0) r: 3
$y = 3$

(1, 3)



4. $(x+3)^2 + (y-1)^2 = 1$ C: (-3, 1) r: 1
$x - 3y = 3$

$-3y = -x + 3$
-3
$y = \frac{1}{3}x - 1$



NO SOL.

Solve the system algebraically.

5. $x^2 + y^2 = 18$
$x - y = 0$

① $x = y$ ↓ use

$x^2 + x^2 = 18$
$2x^2 = 18$
$x^2 = 9$
$x = \pm 3$

③

$x=3$	$x=-3$
$3-y=0$	$-3-y=0$
$3=y$	$-3=y$

④ $(3,3)$ $(-3,-3)$

6. $x^2 + y^2 = 25$
$y = x+1$

① $x^2 + (x+1)^2 = 25$
$x^2 + x^2 + 2x + 1 = 25$
$2x^2 + 2x - 24 = 0$
$2(x^2 + x - 12) = 0$
$(x+4)(x-3) = 0$
$x = -4, 3$

use ↓

②

$x=-4$	$x=3$
$y=-4+1$	$y=3+1$
$y=-3$	$y=4$

$(-4,-3)$ $(3,4)$

7. $x^2 - 2x + y^2 - 2y = 2$
$x + y = 4$

① $y = -x+4$ use ↓

② $x^2 - 2x + (-x+4)^2 - 2(-x+4) = 2$
$(-x+4)(-x+4)$
$x^2 - 2x + x^2 - 8x + 16 + 2x - 8 = 2$
$2x^2 - 8x + 6 = 0$
$2(x^2 - 4x + 3) = 0$
$(x-3)(x-1) = 0$
$x = 3, 1$

③

$x=3$	$x=1$
$y=-3+4$	$y=-1+4$
$y=1$	$y=3$

$(3,1)$ $(1,3)$

8. $x^2 + y^2 - 4x - 6y = -9$
$x + y = 1$

① $y = -x+1$

② $x^2 + (-x+1)^2 - 4x - 6(-x+1) = -9$
$(-x+1)(-x+1)$
$x^2 + x^2 - 2x + 1 - 4x + 6x - 6 = -9$
$2x^2 + 4 = 0$
$2(x^2 + 2) = 0$
$x^2 + 2 = 0$
$x^2 = -2$
$x = \text{imag.}$

no sol.

which means if you were to graph, these don't intersect ☺

Answers: 1. (−1, 2),(1, −2) 2. (7, 0), (0, −7) 3. (1, 3) 4. no solution
5. (3, 3), (−3, −3) 6. (−4, −3), (3, 4) 7. (3, 1), (1, 3) 8. no solution