Answer on Question #57346 – Math – Algebra

Question

In the system shown below, what are the coordinates of the solution that lies in quadrant IV?

Write your answer in the form (a, b) without using spaces.

$$\begin{cases} X^2 + y^2 = 25 \\ x - y^2 = -5 \end{cases}$$

Solution

The second equation of the system gives $y^2=x+5$;
substitute it into the first equation: $x^2+x+5=20$; $x^2+x-20=0$.
the discriminant is $D= b^2-4ac=1-4*(-20)=81$

$X_{1,2}=\frac{-b\pm\sqrt{D}}{2a}=\frac{-1\pm 9}{2}$

$X_1=-5$; then $y^2=0$; $y=0$; we have (-5,0)
$X_2=4$; then $y^2=9$; we have (4,3) and (4,-3)
The coordinates of the solution that lies in quadrant IV when $x>0$, $y<0$, so the answer is (4,-3)
Answer: (4,-3).

Question

In the system shown below, what are the coordinates of the solution that lies in the quadrant 3

Write your answer in the form (a, b) without using spaces.

$$\begin{cases} 2x^2 + y^2 = 33 \\ x^2 + y^2 + 2y = 19 \end{cases}$$

Solution

$$\begin{cases} 2x^2 + y^2 = 33 \ |*(-1) \\ x^2 + y^2 + 2y = 19 \ |*(2) \end{cases}$$

$$+\begin{cases} -2x^2 - y^2 = -33 \\ 2x^2 + 2y^2 + 4y = 38 \end{cases}$$

$y^2+4y=5$;
$y^2+4y-5=0$;

$D= b^2-4ac=16-4*(-5)=36$; $y_{1,2}=\frac{-b\pm\sqrt{D}}{2a}=\frac{-4\pm 6}{2}$;

$y_1=-5$: substitute it into the first equation of the system: $2x^2 + 25 = 33$; $x^2=4$; $x=2$ or $x=-2$. We get (2,-5); (-2,-5).
$y_2=1$: substitute it into the first equation of the system: $2x^2 + 1 = 33$; $x^2=16$; $x=4$ or $x=-4$. We get (4,1); (-4,1).
If the coordinates $x<0$, $y<0$ then the solution lies in the quadrant 3, so the answer is (-2,-5)

Answer: (-2,-5).