Math 25 - Fall 2016

Quiz 4: Thursday September 8, 2016

1. (3 points) Solve the following system of equations:

$$\begin{cases} 3x - 5y = 19 \\ 5x + 2y = 11 \end{cases}$$

① by 2, ② by 5

$\Rightarrow 6x - 10y = 38$

$\underline{25x + 10y = 55}$

$31x \qquad = 93$

$x = 3$

$3x - 5y = 19$

$3(3) - 5y = 19$

$9 - 5y = 19$

$-5y = 10$

$y = -2$

$\boxed{(3, -2)}$

2. (3 points) Solve the following system of equations:

$$\begin{cases} x - 3y + 3z = -4 \\ 2x + 3y - z = 15 \\ 4x - 3y - z = 19 \end{cases}$$

① by -2 and ① by -4

$-2x + 6y - 6z = 8$

$\underline{2x + 3y - z = 15}$

$9y - 7z = 23$

$-4x + 12y - 12z = 16$

$\underline{4x - 3y - z = 19}$

$9y - 13z = 35$

$\begin{cases} 9y - 7z = 23 \\ 9y - 13z = 35 \end{cases}$

$-9y + 7z = -23$

$\underline{9y - 13z = 35}$

$-6z = 12$

$z = -2$

$9y - 13(-2) = 35$

$9y + 26 = 35$

$9y = 9$

$y = 1$

$2x + 3y - z = 15$

$2x + 3(1) - (-2) = 15$

$2x + 3 + 2 = 15$

$2x + 5 = 15$

$2x = 10$

$x = 5$

$\boxed{\begin{array}{l} x = 5 \\ y = 1 \\ z = -2 \end{array}}$

Please, show all work.

3. (3 points) Solve the following system of nonlinear equations (you can use the graph paper to help you, but you need to find the solutions by hand calculation).

$$\begin{cases} (x-2)^2 + (y-2)^2 = 4 \\ y - 2 = \sqrt{x} \end{cases}$$

→ circle, $r = 2$, center $(2,2)$

→ $y = \sqrt{x} + 2$
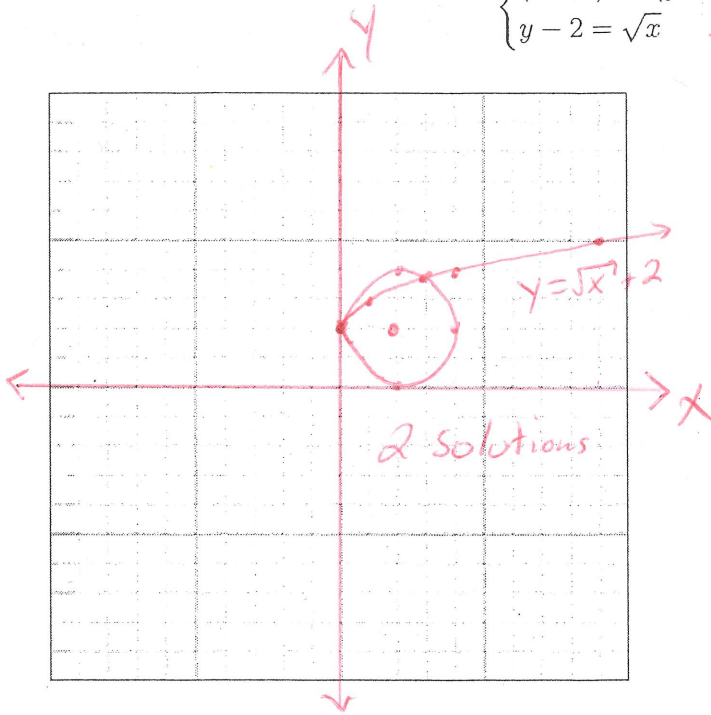
$$(x-2)^2 + (\sqrt{x}+2-2)^2 = 4$$
$$x^2 - 4x + 4 + (\sqrt{x})^2 = 4$$
$$x^2 - 4x + 4 + x = 4$$
$$x^2 - 3x = 0$$
$$x(x-3) = 0$$
$$x = 0, 3$$

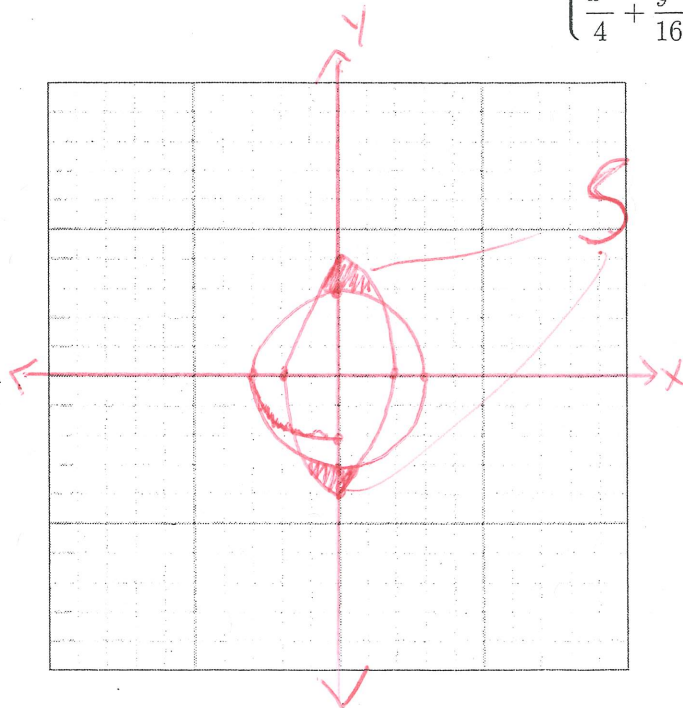$\underline{x = 0}$ $y = \sqrt{0} + 2 = 2$

$\underline{x = 3}$ $y = \sqrt{3} + 2$

$\boxed{\begin{array}{l} (0, 2) \\ (3, \sqrt{3} + 2) \end{array}}$

$y = \sqrt{x} + 2$

2 Solutions

4. (3 points) Solve the following nonlinear system of inequalities

$$\begin{cases} x^2 + y^2 \geq 9 \\ \dfrac{x^2}{4} + \dfrac{y^2}{16} \leq 1 \end{cases}$$

circle, $r = 3$, center $(0,0)$

ellipse, $a = 2$ center $(0,0)$
$b = 4$

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Please, show all work.

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