

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math 002 - Term 151
Recitation (9.5)

Question 1: Solve the system of non-linear equations $\begin{cases} 4x^2 + 9y^2 = 36 \\ x^2 - y^2 = 25 \end{cases}$

Answer: The solution set is

$$SS = \left\{ \left(\frac{3\sqrt{377}}{13}, \frac{8\sqrt{13}}{13}i \right), \left(\frac{3\sqrt{377}}{13}, -\frac{8\sqrt{13}}{13}i \right), \left(-\frac{3\sqrt{377}}{13}, \frac{8\sqrt{13}}{13}i \right), \left(-\frac{3\sqrt{377}}{13}, -\frac{8\sqrt{13}}{13}i \right) \right\}$$

Question 2: Solve the system of equations $\begin{cases} 3x^2 + 2xy + y^2 = 4 \\ 4x^2 + xy + y^2 = 4 \end{cases}$ for rational number ordered pairs.

Answer: $SS = \left\{ (0, -2), (0, 2), \left(\frac{\sqrt{6}}{3}, \frac{\sqrt{6}}{3} \right), \left(-\frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3} \right) \right\}$

Question 3: The circle $x^2 + y^2 - 2x = 1$ and the line $2x + y = 5$ intersect at

A) $\left(\frac{3}{5}, \frac{19}{5} \right)$ and $(3, -1)$

D) $\left(\frac{3}{5}, \frac{19}{5} \right)$ and $(2, 1)$

B) $\left(\frac{12}{5}, \frac{1}{5} \right)$ and $(2, 1)$

E) $\left(\frac{1}{5}, \frac{23}{5} \right)$ and $(3, -1)$

C) $\left(\frac{1}{5}, \frac{23}{5} \right)$ and $(4, -3)$

Answer: $SS = \left\{ \left(\frac{12}{5}, \frac{1}{5} \right), (2, 1) \right\}$

Question 4: The number of intersection points of the graphs of the equation $x^2 + y^2 = 1$ and $4x^2 + (y - 3)^2 = 4$ is:

A) 0

B) 1

C) 3

D) 2

E) 4

Answer: The graph has only **one** intersection point $(0, 1)$.

$$SS = \left\{ (2i\sqrt{2}, -3), (-2i\sqrt{2}, -3), (0, 1) \right\}$$

Question 5: Number of points of intersection of the graphs of $y = \frac{6}{x+1}$ and $y = \frac{x}{x-1}$ is

A) 0

B) 1

C) 3

D) 2

E) 4

Answer: $SS = \left\{ (2, 2), \left(3, \frac{3}{2} \right) \right\}$