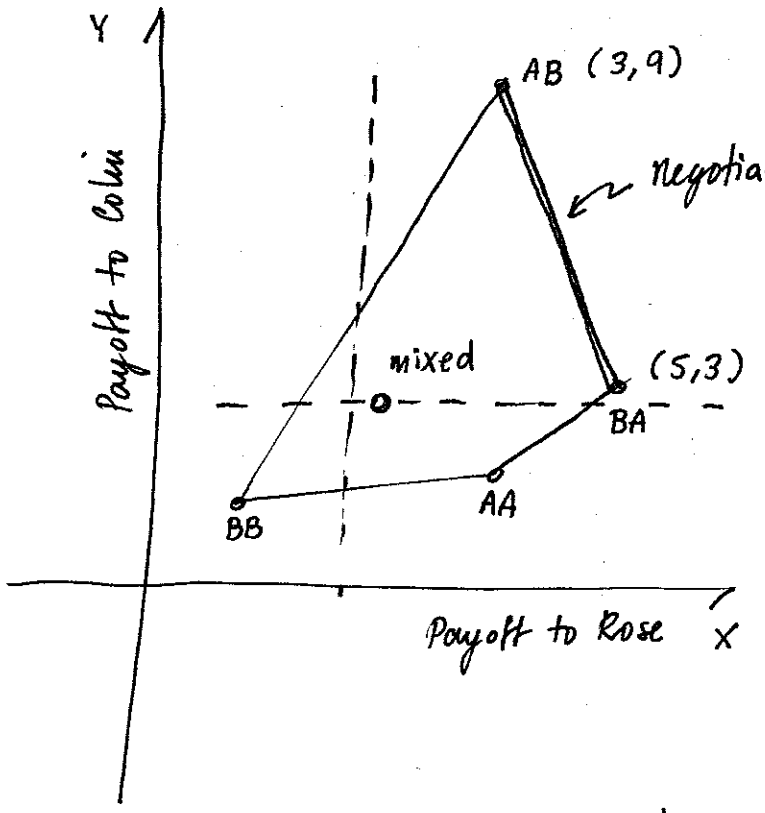
A



note that the security levels are not identical to the mixed strategy

B. The mixed strategy equilibrium is far from Pareto optimal. The two pure strategies are negotiable since one player takes most of the payoff.

C. $m = \frac{9-3}{3-5} = \frac{6}{-2} = -3$

$y = -3x + b$

$(9) = -3(3) + b$

$b = 18$

$y = -3x + 18$

$3 \leq y \leq 9$

The negotiation set lies between AB and BA.

Note that you needed to characterize the domain over which y is valid to receive full credit.

D. $U = (X - X_0)(Y - Y_0)$

$= (X - 3)(Y - 25/9)$

$= (X - 3)(-3X + 18 - 25/9)$

$$U = -3x^2 + \frac{137}{9}x + 9x - \frac{137}{3}$$

$$\frac{dU}{dx} = -6x + \frac{137}{9} + 9 = 0$$

$$-6x = -\frac{218}{9}$$

$$x = \frac{218}{54} = \frac{109}{27}$$

$$y = -3x + 18$$

$$y = -3\left(\frac{109}{27}\right) + 18$$

$$= -\frac{109}{9} + 18$$

$$= \frac{53}{9} = 5\frac{8}{9}$$

The Nash arbitration is $\left(\frac{109}{27}, \frac{53}{9}\right)$.
This is in the negotiation set.
Some of you calculated the implementation which is appreciated but not required by the problem.

E. In my opinion the solution is unfair to Colin. Shouldn't he be allowed to play AB as long as he pays at least 109/27th to Rose? His bargaining position is incompletely considered by the status quo.

F. The worst outcome for the player across all the equilibria is the same as the security level. See below for demonstration.
It is not clear whether this is a general phenomena, or specific to this game.
Full credit to those who could demonstrate their assertion.

The assertion that prudential play does not result in an equilibrium is true, but not at question here.

		Colin A	Colin B
Rose	A	(4,2) → (3,9)	
	B	(5,3) ← (2,1)	

		Colin A	Colin B
Rose	A	4 → 3	
	B	5 → 2	

Rose's game results in a security level of 3.

		Rose A	Rose B
Colin	A π	2 ← 3	
	B $1-\pi$	9 → 1	

$$2\pi + 9 - 9\pi = 3\pi + 1 - \pi$$
$$9 - 7\pi = 2\pi + 1$$
$$8 = 9\pi$$
$$\pi = 8/9$$

Colin's game involves a mixed strategy.

$\frac{8}{9}(3) + \frac{1}{9}(1) = \frac{25}{9}$ is the security level.