Name: _____

Solving Systems of Quadratic Equations (Part 2)

Solve each system below using the following steps:

EXAMPLE: $\begin{cases} y = 4x^2 + 6x + 2 \\ y = 7x^2 - 10x + 7 \end{cases}$

1. Line them up to subtract.	$y = 4x^2 + 6x + 2$ $\underline{-(y = 7x^2 - 10x + 7)}$	**OR ..** 1. Set the two equations equal to each other	$4x^2 + 6x + 2 = 7x^2 - 10x + 7$
2. Change the signs and subtract down.	$y = 4x^2 + 6x + 2$ $\underline{-y = -7x^2 + 10x - 7}$ $\mathbf{0 = -3x^2 + 16x - 5}$	2. Move everything to one side of the equation so that it will equal zero	$4x^2\boxed{-7x^2} + 6x\boxed{+10x} + 2\boxed{-7}$ $= 7x^2\boxed{-7x^2} - 10x\boxed{+10x} + 7\boxed{-7}$ $\mathbf{-3x^2 + 16x - 5 = 0}$
3. Use the quadratic formula (or completing the square, or factoring) to solve for *x*.	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(16) \pm \sqrt{(16)^2 - 4(-3)(-5)}}{2(-3)} = \frac{-16 \pm \sqrt{256 - 4(15)}}{-6}$ $x = \frac{-16 \pm \sqrt{256 - 60}}{-6} = \frac{-16 \pm \sqrt{196}}{-6} = \frac{-16 \pm 14}{-6}$ $x = \frac{-16 - 14}{-6} = \frac{-30}{-6} = \mathbf{5}$ **or** $x = \frac{-16 + 14}{-6} = \frac{-2}{-6} = \mathbf{\frac{1}{3}}$		
4. Pick one of the original equations and plug in the *x*-values to determine the *y*-values.	$y = 4x^2 + 6x + 2$ *seems easier, so I'll use that one.* $y = 4x^2 + 6x + 2$ **for $x = 5$** $y = 4(5)^2 + 6(5) + 2$ $y = 4(25) + 30 + 2$ $y = 100 + 32$ $\mathbf{y = 132}$ $(5, 132)$		$y = 4x^2 + 6x + 2$ **for $x = \frac{1}{3}$** $y = 4\left(\frac{1}{3}\right)^2 + 6\left(\frac{1}{3}\right) + 2$ $y = 4\left(\frac{1}{9}\right) + \frac{6}{3} + 2$ $y = \frac{4}{9} + 2 + 2$ $y = \frac{4}{9} + 4$ $y = \frac{4}{9} + \frac{4 \cdot \mathbf{9}}{\mathbf{9}}$ $y = \frac{4}{9} + \frac{36}{9}$ $\mathbf{y = \frac{40}{9}}$ $\left(\frac{1}{3}, \frac{40}{9}\right)$
5. Check your point(s) in the other equation.	$y = 7x^2 - 10x + 7$ **for $(5, 132)$** $\mathbf{132} = 7(\mathbf{5})^2 - 10(\mathbf{5}) + 7$ $132 = 7(25) - 50 + 7$ $132 = 175 - 43$ $132 = 132$ ✓		$y = 7x^2 - 10x + 7$ **for $\left(\frac{1}{3}, \frac{40}{9}\right)$** $\frac{\mathbf{40}}{\mathbf{9}} = 7\left(\frac{\mathbf{1}}{\mathbf{3}}\right)^2 - 10\left(\frac{\mathbf{1}}{\mathbf{3}}\right) + 7$ $\frac{40}{9} = 7\left(\frac{1}{9}\right) - \frac{10}{3} + 7$ $\frac{40}{9} = \frac{7}{9} - \frac{10 \cdot \mathbf{3}}{3 \cdot \mathbf{3}} + \frac{7 \cdot \mathbf{9}}{\mathbf{9}}$ $\frac{40}{9} = \frac{7}{9} - \frac{30}{9} + \frac{63}{9}$ $\frac{40}{9} = \frac{-23}{9} + \frac{63}{9}$ $\frac{40}{9} = \frac{40}{9}$ ✓
	The solutions to the system $\begin{cases} y = 4x^2 + 6x + 2 \\ y = 7x^2 - 10x + 7 \end{cases}$ are $\boxed{(5, 132) \text{ \& } \left(\frac{1}{3}, \frac{40}{9}\right).}$		

Solve each system.

1. $\begin{cases} y = 3x^2 - 2x + 9 \\ y = 2x^2 - 10x - 3 \end{cases}$	2. $\begin{cases} y = 3x^2 + x + 3 \\ y = 4x^2 - 3x - 2 \end{cases}$
3. $\begin{cases} y = 8x^2 + 5x + 7 \\ y = 7x^2 + 2x + 5 \end{cases}$	4. $\begin{cases} y = 5x^2 - 11x + 6 \\ y = 3x^2 - 2x + 2 \end{cases}$
5. $\begin{cases} y = 2x^2 + 3x - 9 \\ y = -x^2 + 7x - 10 \end{cases}$	6. $\begin{cases} y = -7x^2 - 4x + 8 \\ y = -5x^2 - 9x + 11 \end{cases}$