SOLVING SIMULTANEOUS EQUATIONS - 1st & 2nd DEGREE IN GENERAL FORM

Solve the following simultaneous equations. (Try to solve some using graphing software.)

1 $2x - 5y = 3$
$x^2 - 2y^2 - 3x = 2$

2 $3y - 4x = 0$
$x^2 + y^2 = 25$

3 $x + 2y = 3$
$xy + 2x + y = 4$

1) $x = \frac{1}{2}(3+5y)$ so $\left[\frac{1}{2}(3+5y)\right]^2 - 2y^2 - 3\left[\frac{1}{2}(3+5y)\right] = 2$

$\frac{1}{4}(9+30y+25y^2) - 2y^2 - \frac{9}{2} - \frac{15}{2}y = 2$

$9 + 30y + 25y^2 - 8y^2 - 18 - 15x2y = 8$

$17y^2 - 17 = 0$ $y = 1$ then $x = \frac{1}{2}(3+5) = 4$

or $y = -1$ and $x = \frac{1}{2}(3-5) = -1$

2) $y = \frac{4}{3}x$ so $x^2 + \left(\frac{4}{3}x\right)^2 = 25 \iff x^2\left(1+\frac{16}{9}\right) = 25$

$x^2 \frac{25}{9} = 25$ so $x^2 = 9$

$x = 3$ and $y = 4$

or $x = -3$ and $y = -4$

3) $x = 3 - 2y$

$(3-2y)y + 2(3-2y) + y = 4 \iff 3y - 2y^2 + 6 - 4y + y - 4 = 0$

$\iff -2y^2 + 2 = 0$ so $y^2 = 1$

$y = 1$ and $x = 3 - 2 = 1$

or $y = -1$ and $x = 3 - 2 \times (-1) = 5$