

## SOLVING PAIRS OF LINEAR EQUATIONS (sec 6.2)

### 1. Graphing (p. 257)

- solve each equation for  $y =$
  - enter into  $Y_1 =$  and  $Y_2 =$  in calculator and graph in appropriate window
  - Use CALC – INTERSECT to find point of intersection
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### 2. Algebraically (elimination method) (p. 258)

- align  $x$  terms,  $y$  terms, and constants underneath each other
  - multiply one or both equations to make either the  $x$  coefficients or  $y$  coefficients match in number (can be opposite signs)
  - add or subtract the corresponding terms, eliminating one variable
  - solve for the remaining variable and substitute that in one of the equations to find the other variable
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### 3. Special Formulas (p. 260)

- set up equations in standard form:  
$$\begin{array}{l} ax + by = p \\ cx + dy = q \end{array} \left. \vphantom{\begin{array}{l} ax + by = p \\ cx + dy = q \end{array}} \right\} \begin{array}{l} \text{any of the variables} \\ \text{can be negative} \end{array}$$

- Use these formulas:

$$x = \frac{pd - qb}{ad - bc} \qquad y = \frac{qa - pc}{ad - bc}$$

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### 4. Determinants (p. 261)

- set up equations in standard form:  
$$\begin{array}{l} ax + by = \text{constant} \\ cx + dy = \text{constant} \end{array}$$

- set up the four  $x$  &  $y$  coefficients in a matrix form  $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$  and find determinant as  $ad - bc$ . This will be your denominator.

$$\text{c) } x = \frac{\begin{vmatrix} \text{const} & b \\ \text{const} & d \end{vmatrix}}{\det \text{ of } x \& y} \qquad \text{d) } y = \frac{\begin{vmatrix} a & \text{const} \\ c & \text{const} \end{vmatrix}}{\det \text{ of } x \& y}$$

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### 5. Matrices – Method #1 (not in book)

- Arrange equations in standard form as in determinants, the six numbers (four coefficients and two constants) will be put into a matrix that has 2 rows and 3 columns – a  $2 \times 3$  matrix.
  - On calculator use:  $2^{\text{ND}}$  – MATRIX – EDIT – A and press enter
  - Type in size of matrix, here it is  $2 \times 3$ , and pressing enter after each number
  - Type in the matrix numbers by row, pressing enter after each number.
  - Use  $2^{\text{ND}}$  – QUIT to save the matrix.
  - Use:  $2^{\text{nd}}$  – MATRIX – MATH – A:rref and press enter
  - Use:  $2^{\text{nd}}$  – MATRIX – NAMES – 1:A and press enter, then type a ) and press enter. Answer appears in last column as  $x$  then  $y$ .
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6. Matrices – Method #2 (page 263)

- a) Set up the coefficients only as a 2 x 2 matrix called A (see above method for steps)
- b) Set up the constants only as a single column matrix size 2 x 1 called B.
- c) Use 2<sup>nd</sup> – MATRIX – NAMES to do the formula:

$[A]^{-1}[B]$  and solution will appear as a column with x then y