



= Year 12 fm = Matrices (Sim. linear equations) = Worksheet 1

<p>1. Use inverse matrix method to solve the following system of simultaneous linear equations.</p> $x - 3y = 7$ $3x + y = 1$	<p>2. Use inverse matrix method to solve the following system of simultaneous linear equations.</p> $\frac{y}{2} - \frac{x}{3} = 1$ $\frac{2x}{5} + \frac{3y}{4} = \frac{1}{2}$
<p>3. Use CAS/calculator to solve for <math>x</math> and <math>y</math>.</p> $\begin{bmatrix} 0.73 & 1.3 \\ 3.9 & -2.7 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5.1 \\ 7.9 \end{bmatrix}$	<p>4. Use CAS/calculator to solve for <math>a</math>, <math>p</math> and <math>t</math>.</p> $\begin{bmatrix} \frac{1}{5} & -\frac{2}{7} & \frac{1}{2} \\ \frac{3}{4} & \frac{2}{3} & \frac{1}{2} \\ \frac{5}{6} & \frac{4}{5} & -\frac{3}{4} \end{bmatrix} \begin{bmatrix} a \\ p \\ t \end{bmatrix} = \begin{bmatrix} \frac{3}{10} \\ \frac{2}{5} \\ \frac{1}{2} \end{bmatrix}$
<p>5. Use CAS/calculator to solve the following system of simultaneous linear equations.</p> $2x - 3z = 1$ $w + y - 0.2z = 2$ $2y - x + w = 1.5$ $5x - z + 4y = -3$	<p>6. A system of simultaneous linear equations can be represented by the following matrix equation.</p> $\begin{bmatrix} 2a & b \\ a & -3b \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$ <p>The solutions to the equations are <math>x = 2</math> and <math>y = -1</math>. Find the values of <math>a</math> and <math>b</math>, and state the simultaneous equations.</p>
<p>7. Write the system of simultaneous equations in matrix form.</p> $3ax - 5by = -27$ $5ax + 3by = 57$ <p>Find <math>a</math> and <math>b</math> when <math>x = y = 3</math>.</p>	<p>8. Consider the simultaneous equations in Q7.</p> $3ax - 5by = -27$ $5ax + 3by = 57$ <p>Use matrix method to find <math>a</math> and <math>b</math> when <math>x = a</math> and <math>y = b</math>.</p>
<p>9. Write the system of simultaneous equations in matrix form.</p> $2px - qy + 5rz = 11$ $-px + 2qy - 2rz = -9$ $3px + 3qy - rz = -14$ <p>Find <math>p</math>, <math>q</math> and <math>r</math> when <math>x = 1</math>, <math>y = -1</math> and <math>z = 2</math>.</p>	<p>Numerical, algebraic and worded answers.</p> <ol style="list-style-type: none"> <li><math>x = 1, y = -2</math></li> <li><math>x = -10/9, y = 34/27</math></li> <li><math>x = 3.4143, y = 2.0058</math></li> <li><math>a = 0.9915, p = -0.4676, t = -0.0638</math></li> <li><math>w = 2.5171, x = -0.2051, y = -0.6111, z = -0.4701</math></li> <li><math>a = 1/2, b = 1, x + y = 1, 1/2 x - 3y = 4</math></li> <li><math>\begin{bmatrix} 3a &amp; -5b \\ 5a &amp; 3b \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -27 \\ 57 \end{bmatrix}, a = 2, b = 3</math></li> <li><math>a = \pm\sqrt{6}, b = \pm 3</math></li> <li><math>\begin{bmatrix} 2p &amp; -q &amp; 5r \\ -p &amp; 2q &amp; -2r \\ 3p &amp; 3q &amp; -r \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 11 \\ -9 \\ -14 \end{bmatrix}, p = -1, q = 3, r = 1</math></li> </ol>