Solutions for practice in 4.3 Multivariable Systems

1. $4x - 3y - 2z = 21$
   $6y - 5z = -8$
   $3z = -6$

$3z = -6$

$\boxed{z = -2}$

$6y - 5z = -8$

$6y - 5 \cdot (-2) = -8$

$6y + 10 = -8$

$6y = -18$

$\boxed{y = -3}$

$4x - 3y - 2z = 21$

$4x - 3 \cdot (-3) - 2(-2) = 21$

$4x + 9 + 4 = 21$

$4x + 13 = 21 \qquad / - 13$

$4x = 8 \qquad / \div 4$

$\boxed{x = 2}$

2. $x + y - z = -1$
   $x - 2y - 3z = 2$
   $2x + 4y + z = 1$

— subtract 2nd from 1st
— multiply 1st by -2 & add to 3rd

$$x + y - z = -1$$
$$3y + 2z = -3$$
$$2y + 3z = 3$$

multiply 2nd by -2,
3rd by 3 and add them:

$$x + y - z = -1$$
$$3y + 2z = -3$$
$$\boxed{z = 3}$$

$$
\begin{array}{l|l}
3y + 2z = -3 & \cdot -2 \\
2y + 3z = 3 & \cdot 3 \\
\hline
\end{array}
$$

$$-6y - 4z = 6$$
$$6y + 9z = 9$$
$$\overline{5z = 15}$$

$$3y + 2 \cdot 3 = -3$$
$$3y + 6 = -3$$
$$3y = -9$$
$$\boxed{y = -3}$$

$$5z = 15$$
$$z = 3$$

$$x + y - z = -1$$
$$x - 3 - 3 = -1$$
$$x - 6 = -1$$
$$\boxed{x = 5}$$

3. $x - 11y + 4z = 3$
   $2x + 4y - z = 7$
   $5x - 3y + 2z = 3$

$1 \cdot (-2) \searrow 2 +$

$1 \cdot (-5) \searrow 2 +$

$x - 11y + 4z = 3$
$26y - 9z = 1$
$52y - 18z = -12$

$1 \cdot (-2) \searrow 2 +$

$x - 11y + 4z = 3$
$26y - 9z = 1$
$0 = -14$

no solution

4. Solve (from lecture)

Find the equation of the parabola $y = ax^2 + bx + c$ that passes through the points (0,3), (1,4) and (2,3).

$(0,3)$: $\boxed{c = 3}$

$(1,4)$: $a + b + c = 4$ $a + b + 3 = 4$

$(2,3)$: $4a + 2b + c = 3$ $4a + 2b + 3 = 3$

$a + b = 1$

$4a + 2b = 0 \quad | \div 2$

$a + b = 1 \quad | \cdot (-1)$

$2a + b = 0$

$\boxed{y = -x^2 + 2x + 3}$

$-a - b = -1$

$2a + b = 0$

$\boxed{a = -1}$

$a + b = 1$

$-1 + b = 1$

$\boxed{b = 2}$