

$$\textcircled{1} \begin{cases} \frac{x}{12} - y = \frac{1}{4} \\ 4x - 48y = 16 \end{cases} \left| \begin{array}{l} \text{LCM} = 12 \\ \div 4 \end{array} \right.$$

$$\begin{cases} x - 12y = 3 \\ x - 12y = 4 \end{cases} \Rightarrow 3 = 4$$

Contradiction

| There are no solutions |

$$\begin{aligned} x + y &= 15,000 \\ x + 8,700 &= 15,000 \\ x &= 15,000 - 8,700 \\ x &= 6,300 \end{aligned}$$

6,300 \$ invested at 5% and  
8,700 \$ invested at 6%

$$\textcircled{2} \text{ \$15,000 } \begin{cases} \text{I fund at 5\%} \\ \text{II fund at 6\%} \end{cases}$$

Total interest = \$837

Let  $x$  = amount dollars invested in the I fund at 5%  
 $y$  = amount dollars invested in the II fund at 6%

$$\begin{cases} x + y = 15,000 \\ 5\%x + 6\%y = 837 \end{cases}$$

$$\begin{cases} x + y = 15,000 \\ \frac{5}{100}x + \frac{6}{100}y = 837 \end{cases} \cdot 100$$

$$\begin{cases} x + y = 15,000 \\ 5x + 6y = 83,700 \end{cases} \cdot -5$$

Eliminate  $x$ :

$$\begin{cases} -5x - 5y = -75,000 \\ 5x + 6y = 83,700 \end{cases}$$

$$\textcircled{+} y = 8,700 \text{ \$}$$

$$\textcircled{3} \begin{cases} x + y + 2z = 11 & \textcircled{1} \\ x + y + 3z = 14 & \textcircled{2} \\ x + 2y - z = 5 & \textcircled{3} \end{cases}$$

Eliminate  $x$ :

$$\begin{cases} \textcircled{1} x + y + 2z = 11 \\ \textcircled{2} x + y + 3z = 14 \end{cases}$$

$$\textcircled{-} \begin{array}{r} -z = -3 \\ \boxed{z = 3} \end{array} \textcircled{4}$$

$$\begin{cases} \textcircled{2} x + y + 3z = 14 \\ \textcircled{3} x + 2y - z = 5 \end{cases}$$

$$\textcircled{-} \boxed{-y + 4z = 9} \textcircled{5}$$

$$\begin{cases} \textcircled{4} z = 3 \\ \textcircled{5} -y + 4z = 9 \end{cases}$$

$$-y + 4(3) = 9$$

$$-y + 12 = 9$$

$$\boxed{y = +3}$$

$$\begin{aligned} \textcircled{1} x + y + 2z &= 11 \\ x + 3 + 6 &= 11 \Rightarrow \end{aligned}$$

$$\boxed{x = 2}$$

The solution is  $(2, 3, 3)$

$$\begin{aligned}
 (4) \quad y &= ax^2 + bx + c \\
 (-1, 6) \in \text{graph} &\Rightarrow x = -1, y = 6 \Rightarrow \begin{cases} a(-1)^2 + b(-1) + c = 6 & (1) \\ a(1)^2 + b(1) + c = 4 & (2) \\ a(2)^2 + b(2) + c = 9 & (3) \end{cases} \\
 (1, 4) \in \text{graph} &\Rightarrow x = 1, y = 4 \\
 (2, 9) \in \text{graph} &\Rightarrow x = 2, y = 9
 \end{aligned}$$

$$\begin{cases}
 (1) \quad a - b + c = 6 \\
 (2) \quad a + b + c = 4 \\
 (3) \quad 4a + 2b + c = 9
 \end{cases}$$

Eliminate  $c$ :

$$\begin{cases}
 (1) \quad a - b + c = 6 \\
 (2) \quad a + b + c = 4
 \end{cases}$$

$$\ominus \quad -2b = 2 \Rightarrow \boxed{b = -1} \quad (4)$$

$$\begin{cases}
 (1) \quad a - b + c = 6 \\
 (3) \quad 4a + 2b + c = 9
 \end{cases} \quad | \quad -1$$

$$\begin{cases}
 -a + b - c = -6 \\
 4a + 2b + c = 9
 \end{cases}$$

$$3a + 3b = 3 \quad | \div 3$$

$$\boxed{a + b = 1} \quad (5)$$

$$\begin{cases}
 (4) \quad b = -1 \\
 (5) \quad a + b = 1
 \end{cases}$$

$$a - 1 = 1$$

$$\boxed{a = 2}$$

$$3 + c = 6$$

$$\boxed{c = 3}$$

$$\begin{aligned}
 (1) \quad a - b + c &= 6 \\
 2 - (-1) + c &= 6
 \end{aligned}$$

The function is

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