Column 1

$$3x+4y-24=0 \quad , \quad \underset{x\ \ g}{(4,\ 3)}$$

$$\underset{x\ \ y}{(-2,-5)}$$

$$(-2,-f) \rightarrow x^2+y^2+2gx+2fy+c=0$$

$$(-2)^2+(-5)^2+2g(-2)+2f(-5)+c=0$$

$$4+25-4g-10f+c=0$$

$$-4g-10f+c+29=0 \longrightarrow i$$

$$16+9+8g+6f+c=0$$

$$8g+6f+c+25=0 \longrightarrow ii$$

$$\underline{+4g-10f+c+29=0 \longrightarrow i}$$

$$12g+16f-4=0 \longrightarrow iii$$

Column 2

$$y=mx+c$$

$$4y=-3x+24$$

$$y=-\tfrac{3}{4}x+6 \longrightarrow$$

$$\begin{aligned} m_1m_2&=1 \quad \Rightarrow m=-\tfrac{1}{-\tfrac{3}{4}} \\ \text{or } m_1&=-\tfrac{1}{m_2} \quad m=\tfrac{4}{3} \end{aligned}$$

$$\boxed{y-y_1 = m(x-x_1)}$$

$$y-3=\tfrac{4}{3}(x-4)$$

$$3y-9=4x-16$$

$$4x-3y-7=0 \longrightarrow$$

$$4(-g)-3(-f)-7=0$$

$$-4g+3f-7=0 \longrightarrow iv$$

Column 3

$$y=\left(\frac{10-7x}{1-x}\right)^3$$

$$y^{\frac{1}{3}}=\frac{10-7x}{1-x}$$

$$y^{\frac{1}{3}}-x\,y^{\frac{1}{3}}=10-7x$$

$$7x-x\,y^{\frac{1}{3}}=10-y^{\frac{1}{3}}$$

$$x\left(7-y^{\frac{1}{3}}\right)=10-y^{\frac{1}{3}}$$

$$x=\frac{10-y^{\frac{1}{3}}}{7-y^{\frac{1}{3}}}$$

$$y^{-1}=\frac{10-x^{\frac{1}{3}}}{7-x^{\frac{1}{3}}}$$

$$y^{-1}=\frac{10-(-1)^{\frac{1}{3}}}{7-(-1)^{\frac{1}{3}}}=\frac{10-1}{7+1}$$

$$=\tfrac{11}{8}$$

Column 4

$$g(x)=(-x+9)^3$$

$$h(x)=\frac{2x+1}{x-1}$$

$$f\circ g(x) \Rightarrow$$

$$f(g(x))=\frac{2g(x)+1}{g(x)-1}$$

$$=\frac{2(-x+9)^3+1}{(-x+9)^3-1}$$

$$g\circ h(x)=\left[-(h(x))+9\right]^3$$

$$=\left[-\left(\frac{2x+1}{x-1}\right)+9\right]^3$$

$$=\left(\frac{2x+1}{1-x}+9\right)^3$$

$$=\left(\frac{2x+1+9-9x}{1-x}\right)^3=\left(\frac{10-7x}{1-x}\right)^3$$

$$3x + 4y - 24 = 0 \quad , \quad \underset{x \quad y}{(4, 3)}$$

$$\underset{x \quad y}{(-2, -5)}$$

$$x + 2y + 3z = 18$$

$$3x + y + 2z = 23$$

$$2x + z = 13$$

$$\frac{1}{4}x + \frac{1}{2}y + \frac{1}{4}z = 40$$

$$\frac{1}{2}x + \frac{1}{4}y + \frac{1}{4}z = 50$$

$$\frac{1}{2}x + \frac{1}{2}z = 60$$

$$2x + y = 162$$

$$30x + 12y = 23.04$$

$$x + y + z = 600,000$$

$$x + y - z = 0$$

$$5x - y - z = 0$$