Samples **Equation of a straight line SOLUTIONS**

1. To find the equation of the new line, we first need the gradient of the original line. Now,

$$\begin{aligned} -y - 5 - 5x &= -4y + 7x - 23, \text{ so} \\ -y + 4y &= 7x + 5x - 23 + 5 \\ 3y &= 12x - 18 \\ y &= 4x - 6 \end{aligned}$$

Hence, the gradient of the original line is $m = 4$.
The new line is parallel to the original line, so it has the same gradient as the original line. Thus the equation of the line is $y = 4x + c$ and we can substitute the coordinates of the point $(x_1, y_1) = (0, -5)$ into this equation to get the value for c.
$-5 = 4 \times 0 + c$, so $-5 = c$.
Hence the equation of the line is $y = 4x - 5$.

2. To find the equation of the new line, we first need the gradient of the original line. Now,

$$\begin{aligned} 8 + 6x + 7y &= 7x + 6y + 5, \text{ so} \\ 7y - 6y &= 7x - 6x + 5 - 8 \\ y &= x - 3 \end{aligned}$$

Hence, the gradient of the original line is $m = 1$.
The new line is parallel to the original line, so it has the same gradient as the original line. Thus the equation of the line is $y = x + c$ and we can substitute the coordinates of the point $(x_1, y_1) = (-2, 0)$ into this equation to get the value for c.
$0 = 1 \times (-2) + c$, so $0 = -2 + c$. Hence $c = 0 - (-2) = 2$.
Hence the equation of the line is $y = x + 2$.

3. To find the equation of the new line, we first need the gradient of the original line. Now,

$$\begin{aligned} 4x + 7 - 7y &= 21x + 10y + 58, \text{ so} \\ -7y - 10y &= 21x - 4x + 58 - 7 \\ -17y &= 17x + 51 \\ y &= -x - 3 \end{aligned}$$

Hence, the gradient of the original line is $m = -1$.
The new line is parallel to the original line, so it has the same gradient as the original line. Thus the equation of the line is $y = -x + c$ and we can substitute the coordinates of the point $(x_1, y_1) = (7, 2)$ into this equation to get the value for c.
$2 = -1 \times 7 + c$, so $2 = -7 + c$. Hence $c = 2 - (-7) = 9$.
Hence the equation of the line is $y = -x + 9$.