Samples **Equation of a straight line SOLUTIONS**

1. Let $(x_1, y_1) = (6, -8)$ and $(x_2, y_2) = (-3, -5)$. To find the equation of the line through (x_1, y_1) and (x_2, y_2) you must find the gradient m and the y-intercept c.

Then $m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{-5 - (-8)}{-3 - 6} = \dfrac{3}{-9}$. Hence $m = -\dfrac{1}{3}$.

Thus the equation of the line is $y = -\dfrac{1}{3}x + c$ and we can substitute the coordinates of the point $(x_1, y_1) = (6, -8)$ into this equation to get the value for c.

Hence $-8 = -\dfrac{1}{3} \times 6 + c$, so $-8 = -2 + c$. Hence $c = -8 - (-2) = -6$.

Hence the equation of the line is $y = -\dfrac{1}{3}x - 6$.

2. Let $(x_1, y_1) = (7, 10)$ and $(x_2, y_2) = (10, -3)$. To find the equation of the line through (x_1, y_1) and (x_2, y_2) you must find the gradient m and the y-intercept c.

Then $m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{-3 - 10}{10 - 7} = \dfrac{-13}{3}$. Hence $m = -\dfrac{13}{3}$.

Thus the equation of the line is $y = -\dfrac{13}{3}x + c$ and we can substitute the coordinates of the point $(x_1, y_1) = (7, 10)$ into this equation to get the value for c.

Hence $10 = -\dfrac{13}{3} \times 7 + c$, so $10 = -\dfrac{91}{3} + c$. Hence $c = 10 - \left(-\dfrac{91}{3}\right) = \dfrac{121}{3}$.

Hence the equation of the line is $y = -\dfrac{13}{3}x + \dfrac{121}{3}$.

3. Let $(x_1, y_1) = (-2, -10)$ and $(x_2, y_2) = (-2, -7)$. To find the equation of the line through (x_1, y_1) and (x_2, y_2) you must find the gradient m and the y-intercept c.

Then $m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{-7 - (-10)}{-2 - (-2)} = \dfrac{3}{0}$.

Therefore this line has an infinite gradient, and is parallel to the y-axis. It's equation is of the form $x = k$, where k is a constant.

Hence the equation of the line is $x = -2$.