Name: _____ 5-a-day Further Maths

7th April

Corbettmaths

Line L_1 is parallel to $5x - 7y = 31$ and passes through the point (4, 16)
x y

Find the coordinates of the point where L_1 intersects the x-axis.

$(-\frac{92}{5}, 0)$

$7y = 5x - 31$

$y = \frac{5}{7}x - \frac{31}{7}$ $m = \frac{5}{7}$

$y = \frac{5}{7}x + \frac{92}{7}$

$0 = \frac{5}{7}x + \frac{92}{7}$ $x = -\frac{92}{5}$

$y = \frac{5}{7}x + c$

$16 = \frac{20}{7} + c$

$c = \frac{92}{7}$

Use factor theorem to show $(x + 1)$ is a factor of $x^3 - x^2 - 50x - 48$

$f(x) = x^3 - x^2 - 50x - 48$

$f(-1) = -1 - 1 + 50 - 48 = 0$

$\therefore (x+1)$ is a factor

Solve $x^3 - x^2 - 50x - 48 = 0$

$(x+1)(x^2 + bx + c) = x^3 - x^2 - 50x - 48$

$c = -48$

$(x+1)(x^2 + bx - 48)$

$x^2 + bx^2 = -x^2$ $\therefore b = -2$

$(x+1)(x^2 - 2x - 48)$

$(x+1)(x-8)(x+6) = 0$

$x = -1$, $x = 8$ or $x = -6$

The equation of a curve is
$y = (x - 1)(x + 6)$ $y = x^2 + 5x - 6$

P is a point on the curve.
The tangent to the curve at P has gradient –9

Work out the coordinates of P

$(-7, 8)$

$\frac{dy}{dx} = 2x + 5$

$2x + 5 = -9$

$2x = -14$

$x = -7$

$y = (-7 - 1)(-7 + 6)$

$= -8 \times -1$

$= 8$