27th January

Corbettmaths

James is creating a 8-digit code to lock his iPad.

He does not repeat any digit.

How many possible codes can James create?

$10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3$

1814400

Show that $(2x - 3)$ is a factor of

$2x^3 + 9x^2 - 32x + 21$

$2x-3=0$

$2x=3$

$x=1.5$

$f(x) = 2x^3 + 9x^2 - 32x + 21$

$f(1.5) = 2\times1.5^3 + 9\times1.5^2 - 32\times1.5 + 21$

$= 0$

$\therefore$ $(2x-3)$ is a factor.

$\begin{pmatrix} -6 & 2 \\ 5 & -4 \end{pmatrix} \begin{pmatrix} -4 & -2 \\ -5 & m \end{pmatrix} = 14\,\mathbf{I} \begin{pmatrix} 14 & 0 \\ 0 & 14 \end{pmatrix}$

$24 - 10 = 14$ ✓

$12 + 2m = 0$

$m = -6$

Work out the value of m

-6

Solve the simultaneous equations

$$y = x^2 + x - 7$$

$$4x + 2y + 1 = 0$$

$4x + 2y + 1 = 0$

$2y = -4x - 1$

$\div 2 \quad \div 2$

$y = -2x - \frac{1}{2}$

$-2x - \frac{1}{2} = x^2 + x - 7$

$-4x - 1 = 2x^2 + 2x - 14$

$0 = 2x^2 + 6x - 13$

$0 = 2(x^2 + 3x) - 13$

$0 = 2\left[(x + \frac{3}{2})^2 - \frac{9}{4}\right] - 13$

$0 = 2(x + \frac{3}{2})^2 - \frac{9}{2} - 13$

$0 = 2(x + \frac{3}{2})^2 - \frac{35}{2}$

$\frac{35}{2} = 2(x + \frac{3}{2})^2$

$\frac{35}{4} = (x + \frac{3}{2})^2$

$\pm \frac{\sqrt{35}}{2} = x + \frac{3}{2}$

$x = -\frac{3}{2} \pm \frac{\sqrt{35}}{2}$

$x = 1.458$ or $x = -4.458$

$y = -3.416$ $y = 8.416$