

6th July



Corbettmaths

Make  $x$  the subject of  $y = \frac{4x^3 - 11}{3x^3 + w}$

$$\begin{aligned} 3x^3y + wy &= 4x^3 - 11 \\ 11 + wy &= 4x^3 - 3x^3y \\ 11 + wy &= x^3(4 - 3y) \\ x &= \sqrt[3]{\frac{11 + wy}{4 - 3y}} \end{aligned}$$

$a : b = 7 : 8$

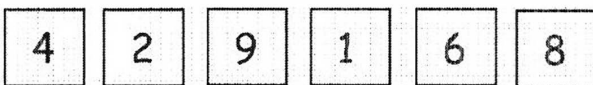
Work out  $(a + 3b) : 9b$

$$\begin{aligned} \frac{a}{b} &= \frac{7}{8} \Rightarrow b = \frac{8}{7}a \\ a + 3b &= \frac{31}{7}a ; 9b = \frac{72}{7}a \\ \Rightarrow a + 3b : 9b &= \underline{31 : 72} \end{aligned}$$

Work out the matrix that transforms the unit square by a  $90^\circ$  anticlockwise rotation about  $O$

$$\begin{aligned} (1, 0) &\rightarrow (0, 1) \\ (0, 1) &\rightarrow (-1, 0) \\ \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \end{aligned}$$

George has the six number cards below.



How many 5-digit **even** numbers can be made that are greater than 30000?

312

$$\begin{aligned} \frac{3}{4,6,8} \times \frac{4}{4,6,8} \times \frac{3}{3} \times \frac{2}{2} \times \frac{1}{2} &= 72 \\ \frac{2}{4,6,8} \times \frac{4}{4,6,8} \times \frac{3}{3} \times \frac{2}{2} \times \frac{3}{3} &= 144 \\ 1 \times 4 \times 3 \times \frac{2}{2,4,6,8} \times 4 &= 96 \\ 72 + 144 + 96 &= 312 \end{aligned}$$