

29th December



Corbettmaths

Barry buys 200 pieces of stationery for £76.

Of the 200 pieces of stationery,  $x$  of them are rulers that cost 50p each and  $y$  of them are pens that cost 20p each.

Find how many rulers Barry buys and how many pens he buys.

$$\begin{aligned} x + y &= 200 \\ 0.5x + 0.2y &= 76 \Rightarrow 5x + 2y = 760 \\ \underline{2x + 2y} &= 400 \\ 3x &= 360 \\ x &= 120 \\ \underline{y} &= 80 \end{aligned}$$

$$\mathbf{A} = \begin{pmatrix} 3 & -2 \\ 4 & 1 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$$

Work out the matrix **AB**

$$\begin{pmatrix} 3 & -2 \\ 4 & 1 \end{pmatrix} \begin{pmatrix} -3 \\ 5 \end{pmatrix} = \underline{\underline{\begin{pmatrix} -19 \\ -7 \end{pmatrix}}}$$

$$y = \frac{3x^4 + 8x}{2x}$$

Work out the possible values of  $x$  when

$$\frac{dy}{dx} = 882$$

$$y = \frac{3}{2}x^3 + 4$$

$$\frac{dy}{dx} = \frac{9}{2}x^2 = 882$$

$$\Rightarrow x^2 = 196$$

$$\Rightarrow \underline{\underline{x = \pm 14}}$$

Prove that every term in the sequence  $n^2 - 12n + 40$  is positive

$$n^2 - 12n + 40 = (n-6)^2 + 4 \geq \underline{\underline{4}}$$