1st September

Corbettmaths
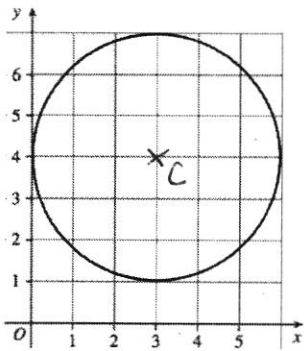
Find the equation of the circle.

$C(3,4) \quad r=3$

$(x-3)^2 + (y-4)^2 = 9$

OABC is transformed by the matrix
$\begin{pmatrix} -2 & 0 \\ 0 & -2 \end{pmatrix}$ to give OA'B'C'
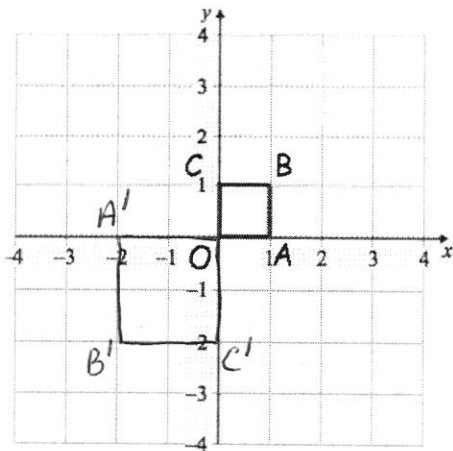
Draw and label OA'B'C'

$\begin{pmatrix} -2 & 0 \\ 0 & -2 \end{pmatrix}\begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 0 & -2 & -2 & 0 \\ 0 & 0 & -2 & -2 \end{pmatrix}$

$\quad\quad\quad\quad\quad\quad\quad\quad A' \quad B' \quad C'$

Describe the transformation fully.

Enlargement centre O
s.f. -2

The volume of a container with a height of x, is given by

$V = x(x-1)(10-x)$

where $1 < x < 10$

Find $\dfrac{dV}{dx}$

$V = x\left(-x^2 + 11x - 10\right)$

$\quad = -x^3 + 11x^2 - 10x$

$\dfrac{dV}{dx} = -3x^2 + 22x - 10$

Hence find the value of x for which the volume is a maximum. Give your answer to 1 decimal place.

$3x^2 - 22x + 10 = 0$

$x = \dfrac{22 \pm \sqrt{364}}{6}$

$= 0.5, \; 6.9 \; (1 \, d.p.)$