

FP1 Revision Worksheet Number 4

1. Fill in the gaps in the following table:

Matrix	$\begin{pmatrix} -1, 0 \\ 0, 1 \end{pmatrix}$		$\begin{pmatrix} 2, 0 \\ 0, 1 \end{pmatrix}$		$\begin{pmatrix} 1, 0 \\ 0, 4 \end{pmatrix}$
Description of transformation		Rotation by 45° anticlockwise about the origin		Reflection in the line $y = x$	

2. Show that the equation $x^5 + 2 = x$ has a root between $x = -1$ and $x = -2$. Starting with an approximation of $x = -1.5$ and using the Newton-Raphson method once, obtain a better approximation to this root.
3. Sketch the curve $y = \frac{x+2}{x^2-4}$ stating the equations of any asymptotes and points where the curve crosses the axes.
4. Solve the following equation finding z in the form $a+bi$:
- $$4z - 2 = 2z^* - 12i$$
5. For the curve $y = \frac{-2x^2 - 2x - 1}{x^2 + x}$, show that the curve does not exist for $-2 < x < 2$. Hence find the coordinates of the turning points of the curve.
6. Prove the following:
- $$\sum_{r=1}^n 6r^2 + 2r + 1 = n(2n^2 + 4n + 3)$$
7. On the same diagram sketch clearly the curves:
- $y^2 = x$
 - $y^2 = x + 4$
 - $(y + 4)^2 = x$
 - $y^2 = 4x$
8. Give the general solution of the following trig equation:
- $$\cos\left(\frac{\pi}{4} - x\right) = 0$$