

PROBLEM 1

Deadline: 25.10

Show that $\tan 3\theta = \frac{3 \tan \theta - \tan^3 \theta}{1 - 3 \tan^2 \theta}$.

Given that $\theta = \arccos(\frac{2}{\sqrt{5}})$ and $0 < \theta < \frac{\pi}{2}$, show that $\tan 3\theta = \frac{11}{2}$.

Hence, or otherwise, find all solutions of the equations:

$$(a) \tan(3 \arccos x) = \frac{11}{2},$$

$$(b) \cos\left(\frac{1}{3} \arctan y\right) = \frac{2}{\sqrt{5}}.$$