MTH 385 Homework due 2022-03-21

Exercise 1 (5.5.2)**.** *Use Cardano's formula to solve* $y^3 = 2$*. Do you get the obvious solution?*

Exercise 2 (5.5.3)**.** *Use Cardano's formula to solve* $y^3 = 6y + 6$*, and check your answer by substitution.*

Exercise 3 (5.6.2)**.** *Use (3) and* $\sin\alpha = \cos(\pi/2 - \alpha)$, $\cos\alpha = \sin(\pi/2 - \alpha)$ *to show that*

$$(\sin\theta + i\cos\theta)^n = \begin{cases} \sin n\theta + i\cos n\theta & \text{when } n = 4m + 1 \\ -\sin n\theta - i\cos n\theta & \text{when } n = 4m + 3. \end{cases}$$

Exercise 4 (5.6.3)**.** *Deduce from Exercise 5.6.2 that (2) is correct for* $n = 4m + 1$ *and false for* $n = 4m + 3$*, and hence that (1) is a correct relation between* $y = \sin n\theta$ *and* $x = \sin\theta$ *only when* $n = 4m + 1$.

Exercise 5 (5.6.4)**.** *Show that (1) is a correct relation between* $y = \cos n\theta$ *and* $x = \cos\theta$ *for all n (de Moivre (1730)).*