Norwegian University of Science and Technology
Departement of Mathematical Sciences

TMA4110 Calculus 3 Autumn 2010

Exercise set 5 – Week 39

Edwards & Penney, section 1.2

11,15,28

Edwards & Penney, section 1.3

5,14

Exam problems

A-4a Find all the complex third roots of $8i$ (i.e. $\sqrt[3]{8i}$), and write them in the form $a + ib$ for $a, b \in \mathbb{R}$. Graph the roots in the complex plane.

A-8 The motion of a mechanical system is given by the differential equation $my'' + ky = \cos \omega t$ where $m = 2$ and $k = 8$. For what values of ω will the solution $y(t)$ be unbounded as $t \to \infty$?

Multiple-choice questions

1 Given

$$y'' + 8y' + 16y = x^2 e^{-4x}$$

Which of the following expressions for y_p is the correct one to use in the method of undetermined coefficients?

A: $y_p = e^{-4x}(Ax^2 + Bx + C)$ **B:** $y_p = e^{-4x}(Ax^3 + Bx^2 + Cx)$

C: $y_p = e^{-4x}Ax^2$ **D:** $y_p = e^{-4x}(Ax^4 + Bx^3 + Cx^2)$

2 Suppose that $z^3 = 2e^{i\pi/6}$. What is the smallest positive integer n, such that z^n is a real number?

A: 6 **B:** 9 **C:** 18 **D:** 36