INSA | INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

SCAN 1 — Quiz #9 — 10' *November 22, 2017*

Name: PACAUT Nastasia

16/20

Exercise 1. Let $f : \mathbb{R} \to \mathbb{R}$ be a bounded function and let $g : \mathbb{R} \to \mathbb{R}$ be a function such that $\lim_{x \to +\infty} g(x) = +\infty$. What is the value of the following limit? no justifications required.

2

$\lim_{x \to +\infty} f(x) + g(x) = +\infty$

Exercise 2.

1. Give the general real solution of the following differential equation:

$$f'' - f' - 2f = 0.$$

5

$f(x) = Ae^{-x} + Be^{2x}$, $A, B \in \mathbb{R}$

2. Give the general real solution of the following differential equation:

$$f'' + 2f' + 5f = 0.$$

5

$f(x) = (A\cos(2x) + B\sin(2x))\, e^{-x}$, $A, B \in \mathbb{R}$

Exercise 3.

1. Give the general real solution of the following differential equation:

$$f' + 2f = 0.$$

3

$f(x) = Ae^{-2x}$, $A \in \mathbb{R}$

2. Give the general real solution of the following differential equation:

$$f'(x) + 2f(x) = \cos(3x).$$

e^{3x} $2f(x)$ $2\cos(3x) - 3\sin(3x)$

1

$f(x) = Ae^{-2x} + B$, $A \in \mathbb{R}$ and B is a particular solution of the equation $f'(x) + 2f(x) = \cos(3x)$