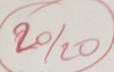
SCAN 1 — Quiz #5 — 10'

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Exercise 1. Let  $a \in \mathbb{R}$  and let f be the polynomial function defined by:

$$f: \mathbb{R} \longrightarrow \mathbb{R}$$

$$x \longmapsto a(a-2)x^2 + ax - a + 7.$$

Determine the degree of f. No justifications required.

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Exercise 2. Let f be the polynomial function defined as

$$f: \mathbb{R} \longrightarrow \mathbb{R}$$
  
 $x \longmapsto x^4 + 2x^3 - 2x - 1$ 

1. Show that 1 and -1 are roots of f.

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2. Determine the polynomial functions g such that

$$\forall x \in \mathbb{R}, \ f(x) = (x-1)(x+2)g(x).$$

No justifications required.

4

$$\forall x \in \mathbb{R}, \ g(x) = \infty^2 \ r2x \ t \mid = (x + 1)^2$$

Deduce the roots of f and their multiplicities. No justifications required.

4

Exercise 3. Let  $\mathbb{K} = \mathbb{R}$  or  $\mathbb{C}$ . Let  $f : \mathbb{K} \to \mathbb{K}$  be a polynomial function, let  $x_0 \in \mathbb{K}$ , and let  $m \in \mathbb{N}^*$ . Recall the definition of

" $x_0$  is a root of f of multiplicity m."

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and g is a polynomial Function on the with g(xo) #0.