Mathematics L2 **EXAM 2** A G221(2MG01) 21.11.18

Exercise 1 Given the function $f(x)=\frac{3x}{\sqrt{4x^4-5x^2+1}}$

1) Study the parity.

2) Give the domain.

Now consider the function $g(x)=\frac{3x^2-4x+1}{\sqrt{4x^4-5x^2+1}}$

3) Determine all the asymptotes of the function $g(x)$ in $\mathbb{R}_+$.

4) Sketch the graph of $g(x)$ in $\mathbb{R}_+$[U:4s].

Exercise 2 Calculate the following limits:

1) $\lim_{x\to 3}\frac{3x^2-11x+6}{2x^2+x-21}$ 2) $\lim_{x\to 1}\frac{\sqrt{3x+1}-2}{2x-2}$

3) $\lim_{x\to 0}\frac{\sin(3x)}{x^2+2x}$ 4) $\lim_{x\to k} 2-3^{\frac{x}{x-2}}$ a) $k$=0, b) $k$=2, c) $k$=∞

Exercise 3 Knowing that the function $f(x)=\sqrt{ax^2+bx+c}$ has a slant asymptote $y=mx+h$ as $x\to\infty$, express $m$ and $h$ in terms of $a$, $b$ and $c$.

Exercise 4 Using the definition, look for the derivative.

1) $f(x)=x^2-2x$ 2) $f(x)=\frac{3}{1-x}$

Exercise 5 Find the derivative for the following functions:

1) $f(x)=(-x^2+3x-1)^4$

2) $f(x)=\frac{1}{sin\left(\frac{x}{2}\right)}$

3) $f(x)=\frac{3x}{\sqrt{1-2x}}$

Exercise 6 a) Find the equation of the tangent to the curve $f(x)=2sin\left(\frac{1}{x}\right)$ at the point with abscissa $\frac{4}{\pi}$ : ( GIVE EXACT VALUES )

b) Determine a point for which the tangent to the curve $f(x)$ is horizontal.