Kenmerk : TW2013/MathB2/SampleTest1

Course : **Mathematics B2: Newton**

Voorbeeldtoest (voor het eerste deel)

Motiveer alle antwoorden en berekeningen.
Gebruik van een rekenmachine is niet toegestaan.

Het totaal aantal punten is 18.

[2 pt] 1. Bereken

$$\lim_{x\to\infty}\left(\frac{2x^2+4x-1}{x^2+7x}\right)^{10}.$$

2. De functie $f:[-3,2]\to\mathbb{R}$ wordt gegeven door:

$$f(x)=\begin{cases}x^2+2x+1 & \text{voor } x\le 0;\\ 1-\sqrt{x} & \text{voor } x>0.\end{cases}$$

[2 pt] (a) Toon aan dat f continu is in 0.

[4 pt] (b) Bepaal het absolute minimum en absolute maximum van f op $[-3,2]$.

[3 pt] 3. Bereken

$$\lim_{x\to 0^+} x^x.$$

4. Gegeven is de functie $f:\mathbb{R}^2\to\mathbb{R}$ door

$$f(x,y)=\begin{cases}\frac{xy}{x^2+y^2} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$$

[3 pt] (a) Geef de definitie van 'f is continu in (x_0,y_0)' en laat zien dat f *niet* continu is in $(0,0)$.

[2 pt] (b) Bepaal $\frac{\partial f}{\partial x}(0,0)$ en $\frac{\partial f}{\partial y}(0,0)$.

[2 pt] (c) Bereken het raakvlak aan het oppervlak $z=f(x,y)$ in $\mathbb{R}^3$ in het punt $(1,2,\frac{2}{5})$.

Kenmerk : TW2013/MathB2/SampleTest1

Course : **Mathematics B2: Newton**

Sample test (for part 1)

Motivate all your answers and calculations.
The use of electronic devices is not allowed.

The total number of points is 18.

[2 pt] 1. Calculate

$$\lim_{x\to\infty}\left(\frac{2x^2+4x-1}{x^2+7x}\right)^{10}.$$

2. The function $f:[-3,2]\to\mathbb{R}$ is given by:

$$f(x)=\begin{cases}x^2+2x+1 & \text{for } x\le 0;\\ 1-\sqrt{x} & \text{for } x>0.\end{cases}$$

[2 pt] (a) Show that f is continuous at $x=0$.

[4 pt] (b) Find the absolute maximum and absolute minimum of f on $[-3,2]$.

[3 pt] 3. Calculate

$$\lim_{x\to 0^+} x^x.$$

4. The function $f:\mathbb{R}^2\to\mathbb{R}$ is given by

$$f(x,y)=\begin{cases}\frac{xy}{x^2+y^2} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$$

[3 pt] (a) Give the definition of 'f is continuous at (x_0,y_0)' and show that f is *not* continuous at $(0,0)$.

[2 pt] (b) Find $\frac{\partial f}{\partial x}(0,0)$ and $\frac{\partial f}{\partial y}(0,0)$.

[2 pt] (c) Calculate the tangent plane to the surface $z=f(x,y)$ in $\mathbb{R}^3$ at the point $(1,2,\frac{2}{5})$.