

toets 1, 27 november 2013

$$1a) \vec{AB} = \langle -1, 3, 4 \rangle - \langle 1, 2, 3 \rangle = \langle -2, 1, 1 \rangle$$

$$\vec{AC} = \langle 0, 1, 5 \rangle - \langle 1, 2, 3 \rangle = \langle -1, -1, 2 \rangle$$

$$\cos \angle BAC = \frac{\vec{AB} \cdot \vec{AC}}{|\vec{AB}| |\vec{AC}|} = \frac{2 - 1 + 2}{\sqrt{6} \sqrt{6}} = \frac{3}{6} = \frac{1}{2}$$

$$\angle BAC = \frac{\pi}{3}$$

$$b) O_{pp.} \Delta ABC = \frac{1}{2} |\vec{AB} \times \vec{AC}| = \frac{1}{2} \left| \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -2 & 1 & 1 \\ -1 & -1 & 2 \end{vmatrix} \right| =$$

$$\frac{1}{2} |\langle 3, 3, 3 \rangle| = \frac{3}{2} \sqrt{3}$$

$$2. \frac{1}{y} y' + y + x y' - \frac{1}{2\sqrt{x-2y}} (1-2y') = 0 \quad \text{in } (3, 1):$$

$$y' + 1 + 3y' - \frac{1}{2} (1-2y') = 0 \quad 5y' + \frac{1}{2} = 0$$

$$y' = -\frac{1}{10}$$

$$3. \lim_{x \rightarrow e} \frac{\ln^2 x - 1}{x - e} = \lim_{x \rightarrow e} \frac{2 \ln x \cdot \frac{1}{x}}{1} = \frac{2}{e}$$

(l'Hospital $\left(\frac{0}{0}\right)$)

$$4. (a) x+1 \geq 0 \rightarrow x \geq -1 \quad [-1, \infty)$$

$$(b) \left[0, \frac{\pi}{2}\right)$$

$$(c) f(2) = \arctan \sqrt{3} = \frac{\pi}{3}$$

$$(d) f'(x) = \frac{1}{1+(x+1)} \cdot \frac{1}{2\sqrt{x+1}} = \frac{1}{x+2} \cdot \frac{1}{2\sqrt{x+1}}$$

$$f'(2) = \frac{1}{4} \cdot \frac{1}{2\sqrt{3}} = \frac{1}{8\sqrt{3}}$$

$$(e) \arctan \sqrt{x+1} = y \quad \sqrt{x+1} = \tan y \quad x+1 = \tan^2 y$$

$$x = -1 + \tan^2 y \quad g(x) = -1 + \tan^2 x$$