EEM (1.Öğretim) Kısa Sınav-1 27.01.2014

EEM (1. öğretim) K.S. 1 27.10.2014

Soru: $\displaystyle\lim_{x\to\sqrt{3}} \frac{\ln(\sqrt{3}x-2)}{\operatorname{Arctan}x-\frac{\pi}{3}}$ limitini (L'Hospitalsiz) hesaplayınız

Çözüm: $\displaystyle\lim_{x\to\sqrt{3}} \frac{\ln(\sqrt{3}x-2)}{\operatorname{Arctan}x-\frac{\pi}{3}} \overset{0/0}{=} \lim_{x\to\sqrt{3}} \frac{\ln[1+(\sqrt{3}x-3)]}{\operatorname{Arctan}x-\operatorname{Arctan}\sqrt{3}} =$

$$= \lim_{x\to\sqrt{3}} \frac{\ln(1+(\sqrt{3}x-3))}{\operatorname{Arctan}\frac{x-\sqrt{3}}{1+\sqrt{3}x}} = \lim_{x\to\sqrt{3}} \frac{\ln[1+\sqrt{3}(x-\sqrt{3})]}{\sqrt{3}(x-\sqrt{3})} \cdot \frac{\sqrt{3}(x-\sqrt{3})}{\operatorname{Arctan}\frac{x-\sqrt{3}}{1+\sqrt{3}x}}$$

$$= \underbrace{\lim_{x\to\sqrt{3}} \frac{\ln[1+\sqrt{3}(x-\sqrt{3})]}{\sqrt{3}(x-\sqrt{3})}}_{=1 \text{ (özel lim)}} \cdot \lim_{x\to\sqrt{3}} \frac{\frac{\sqrt{3}(x-\sqrt{3})}{1+\sqrt{3}x}\cdot(1+\sqrt{3}x)}{\operatorname{Arctan}\frac{(x-\sqrt{3})}{1+\sqrt{3}x}}$$

$$= 1 \cdot \lim_{x\to\sqrt{3}} (1+\sqrt{3}x)\cdot\sqrt{3}\cdot \underbrace{\lim_{x\to\sqrt{3}} \frac{\frac{(x-\sqrt{3})}{1+\sqrt{3}x}}{\operatorname{Arctan}\frac{\sqrt{3}(x-\sqrt{3})}{1+\sqrt{3}x}}}_{=\frac{1}{1} \text{ (özel limit)}} = 1\cdot(1+\sqrt{3}\cdot\sqrt{3})\sqrt{3}\cdot 1 = 4\sqrt{3}$$