Answer on Question #61375 – Math – Calculus

Question

5 Evaluate the limit $\lim\limits_{x\to\infty}\left(\frac{6e^{4x}-e^{-2x}}{8e^{4x}-e^{-2x}+3e^{-x}}\right)$

a)3/4

b)1/4

c)1/2

d)3/5

Solution

$$\lim_{x\to\infty}\left(\frac{6e^{4x}-e^{-2x}}{8e^{4x}-e^{-2x}+3e^{-x}}\right)=$$

$$=\lim_{x\to\infty}\left(\frac{(6e^{4x}-e^{-2x}):e^{4x}}{(8e^{4x}-e^{-2x}+3e^{-x}):e^{4x}}\right)=\lim_{x\to\infty}\left(\frac{6-\frac{e^{-2x}}{e^{4x}}}{8-\frac{e^{-2x}}{e^{4x}}+\frac{3e^{-x}}{e^{4x}}}\right)$$

$$=\lim_{x\to\infty}\left(\frac{6-e^{-6x}}{8-e^{-6x}+3e^{-5x}}\right)=\frac{\lim\limits_{x\to\infty}(6-e^{-6x})}{\lim\limits_{x\to\infty}(8-e^{-6x}+3e^{-5x})}=\frac{6-0}{8-0+3\cdot 0}=\frac{6}{8}=\frac{3}{4}.$$

Answer: a) $\frac{3}{4}$.

Question

6) Find the derivative $f(x)=2x^2-16x+35$ by using first principle

a) x+16

b)4x−16

c) 3x−5

d) 2x−8

Solution

$f(x+h)=2(x+h)^2-16(x+h)+35=2h^2+4xh+2x^2-16h-16x+35.$

The derivative is

$$\frac{df}{dx}=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$$

$$=\lim_{h\to 0}\frac{(2h^2+4xh+2x^2-16h-16x+35)-(2x^2-16x+35)}{h}$$

$$=\lim_{h\to 0}\frac{2h^2+4xh-16h}{h}=\lim_{h\to 0}(2h+4x-16)=2\cdot 0+4x-16=4x-16.$$

Answer: b) $4x - 16$.