Answer on Question #85213 – Math – Real Analysis

Question

1) EVALUATE

Limit {(2+x)^5/4-(2)^5/4}/{(2+x)^2/3-(2)^2/3}
x tends to zero

Solution

$$\lim_{x\to 0}\frac{\left((2+x)^{\frac{5}{4}}-2^{\frac{5}{4}}\right)}{(2+x)^{\frac{2}{3}}-2^{\frac{2}{3}}}=\left\{\frac{0}{0}\right\}=\lim_{x\to 0}\frac{\frac{5}{4}(2+x)^{\frac{1}{4}}-0}{\frac{2}{3}(2+x)^{-\frac{1}{3}}-0}=\frac{15}{8}\cdot\frac{2^{\frac{1}{4}}}{2^{-\frac{1}{3}}}=\frac{15}{8}\cdot 2^{\frac{7}{12}}=\frac{15}{2^{\frac{29}{12}}}.$$

Answer: $\lim_{x\to 0}\frac{(2+x)^{\frac{5}{4}}-2^{\frac{5}{4}}}{(2+x)^{\frac{2}{3}}-2^{\frac{2}{3}}}=\frac{15}{2^{\frac{29}{12}}}.$

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