SHOW ALL YOUR WORK. NO CREDITS FOR ANSWERES WITHOUT JUSTIFICATIONS

Problem 1: (14 points) Find the limit if it exists. Write ∞ or $(-\infty)$ when appropriate.

a) $\displaystyle\lim_{\theta\to\frac{\pi}{3}} \frac{\tan\theta - \sqrt{3}}{\theta - \dfrac{\pi}{3}}$

b) $\displaystyle\lim_{\theta\to 0} \tan 3\theta \csc\theta$

Problem 2: (8 points) Find all points on the graph of $y = \dfrac{x+2}{x-1}$ where the tangent line is parallel to the line $3x + 4y = 2$

Problem 3: (18 points)

(a) If $y = \left(\dfrac{2}{\sqrt{t}} - 4\sqrt[4]{t} \right)^3$ find $y'(1)$

(b) Find the slope of the tangent line to the curve $x^2 \cos y + x^2 y = 1$ at the point $(1,0)$

(c) Find $f'(e)$ if $f(x) = 2e^{5x} + 3e^e + 4x^e$