If $f(x) = \ln(x)$, find $(f^{-1})'(0)$.

(a) 0 (b) 1 (c) e (d) $\ln(2)$

(e) Does not exist

Let $f(x) = \dfrac{-1}{ax} + \dfrac{b}{a^2}\ln\left(\dfrac{a+bx}{x}\right)$. What is $f'(x)$?

(a) $\dfrac{1}{ax^2+bx^3}$ (b) $\dfrac{a^2+bx}{a^3x^2+a^2bx^3}$ (c) $\dfrac{a+bx}{a^2x+ab^2x}$

(d) $\dfrac{a+b^2x}{a^2x^2+b^2x^2}$ (e) None of the above

Evaluate $f'(\frac{\pi}{4})$ if $f(x) = \ln(\frac{1}{\cos(x)})$

(a) 0 (b) 1 (c) $\ln(\frac{2}{\sqrt{2}})$ (d) $\ln(\frac{\sqrt{2}}{2})$

(e) Does not exist

Where is $f(x) = 3x^4 - 4x^3$ decreasing?

(a) $(-\infty, 0)$ and $(1, \infty)$ (b) $(-\infty, 1)$ (c) $(0, \infty)$

(d) $(1, \infty)$ (e) None of the above

The function $\frac{x}{x^2-x}$ has vertical asymptotes at

(a) $x = 0$ (b) $x = 1$ (c) $x = 0$ and $x = 1$

(d) Nowhere (e) None of the above

Which of the following statements are always true?

(i) If f and g are increasing on an interval, then so is $f + g$

(ii) If f and g are increasing on an interval, then so is fg

(a) (i) only (b) (ii) only (c) Both (i) and (ii)

(d) Neither

A runner sprints around a circular track of radius 100 m at a constant speed of 7 m/s. The runner's friend is standing at a distance of 200m from the center of the track. How fast is the distance between the friends changing when the distance between them is 200m? To receive full credit, you must give an exact answer (i.e. not a decimal approximation.)