

ex1) $f(x) = \frac{3x^2 - 2x}{5x} = \frac{3x-2}{5}$
 $f'(x), f'(1)$ $f = \frac{1}{5}(3x-2)$
 $f' = \frac{1}{5}(3) = \frac{3}{5}$

ex2) $f(x) = \frac{5x-3}{x^2+7}$
 $f'(x), f'(1)$
 $f' = \frac{(x^2+7)(5) - (5x-3)(2x)}{(x^2+7)^2}$
 $f' = \frac{-5x^2 + 6x + 35}{(x^2+7)^2}$
 $f'(1) = \frac{36}{64} = \frac{9}{16}$

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3) $\lim_{x \rightarrow \infty} \left[\frac{5x^3 - 3x^2 + 2}{7 - 4x^2 + 2x^3} \right]$ WA ?
 $y = 5/2$ HA
4) $\lim_{x \rightarrow 3} \left[\frac{x^2 - x - 6}{x - 3} \right] = \frac{0}{0}$
 $\lim_{x \rightarrow 3} \frac{(x-3)(x+2)}{(x-3)} = x+2 = 5$

ex5) $\lim_{x \rightarrow 10} \frac{x^2 + 1}{x - 2} = \frac{101}{8}$

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ex6) Find pts. guaranteed by MVT for $f(x) = \frac{5}{x^2}$ on $[1, 4]$
 $f'(x) = \frac{f(b) - f(a)}{b - a}$
 $\frac{-10}{x^3} = \frac{5/16 - 5}{3}$
 $\frac{-10}{x^3} = \frac{-25}{16}$
 $25x^3 = 160$
 $x^3 = 32/5$
 $x = \sqrt[3]{32/5}$
 ≈ 1.4567

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Find PI & concavity for $f(x) = 4x^3 - x^4$
 $f' = 12x^2 - 4x^3$
 $f'' = 24x - 12x^2 = 0$
 $12x(2-x) = 0$
 $x = 0, 2$
 $(-\infty, 0) \cup (0, 2) \cup (2, \infty)$
 $f'' -$
 $CC \downarrow \quad CC \uparrow \quad CC \downarrow$
 PI
 $(0, 0)$
 $(2, 16)$

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