

Quiz 4 solutions—version A

Name _____

Student ID Number _____

1. Differentiate the following functions of x

(a) $(3x - 5/x)/\sqrt{x}$

$$\frac{3}{2}x^{-1/2} + \frac{15}{2}x^{-5/2}$$

(b) $(\sqrt{x} + 1/\sqrt{x})(x - 2x^3)$

$$\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)(1 - 6x^2) + \left(\frac{1}{2\sqrt{x}} - \frac{1}{2x^{3/2}}\right)(x - 2x^3) = \frac{1 + 3x - 10x^2 - 14x^3}{2\sqrt{x}}$$

(c) $x^2/(x + C)$, where C is a constant

$$\frac{2Cx + x^2}{(C + x)^2}$$

2. Express the limit as a derivative $f'(a)$, and evaluate it:

$$\lim_{x \rightarrow 5} \frac{2^x - 32}{x - 5}$$

For $f(x) = 2^x$, the limit is $f'(5) = 32 \ln 2$.