Worksheet 5
Limits of fractions and chain rule

Exercise 1 *Find the limit, if it exists (can be a number or an infinity). If it doesn't, explain why.*

a) $\lim_{x\to 0} \dfrac{\sin(\frac{\pi}{2} + \sin x)}{x-1}$

b) $\lim_{x\to 1} \dfrac{x^2+x-2}{(x+3)(x-1)^2}$

c) $\lim_{x\to 1} \dfrac{x^2+x-2}{(x+3)(x-1)^3}$

d) $\lim_{x\to 1} \dfrac{x^2+x-2}{(x-3)(x-1)^3}$

e) $\lim_{x\to 2} \dfrac{x^2-3x+2}{x^2-4x+4}$

Exercise 2 *Find the derivative of the function.*

a) $f(x) = \sqrt{\sin x}$

b) $g(x) = \sin\sqrt{x}$

c) $h(x) = (x^3-1)^8$

d) $j(x) = \left(\dfrac{1}{x^2+1}\right)^3$