

1. (4pts) Find **algebraically** (without using calculator) the following limits.

a.  $\lim_{x \rightarrow 0} \frac{e^{-x/2}}{x^2 + 2\pi}$

b.  $\lim_{x \rightarrow \pi/2} x \cos^2(2x)$

2. (13pts) Determine first the type of each limit and then compute **algebraically** (without using calculator) the limit if it exists:

a.  $\lim_{x \rightarrow -1} \frac{x^2 - 1}{x^2 + 2}$

b.  $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - 1}$

c.  $\lim_{h \rightarrow 0} \frac{(h + 1)^2 - 1}{h}$

d.  $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$

e.  $\lim_{x \rightarrow 0} \frac{\sin(\pi x)}{x}$  (use the fact  $\lim_{\theta \rightarrow 0} \frac{\sin(\theta)}{\theta} = 1$ )