

*B. Now, we are going to show that the sine and the cosine are continuous everywhere.*

- 1) Using the angle addition formula express  $\sin(a + h)$  in terms of the sine and cosine of  $a$  and  $h$ .
- 2) True or false:  $\lim_{x \rightarrow a} f(x)$  exists if and only if  $\lim_{h \rightarrow 0} f(a + h)$  does, and if the limits exist, they are equal.
- 3) Using 1), 2) and the limit laws (addition, multiplication, etc.), show that  $\lim_{\theta \rightarrow a} \sin \theta = \sin a$ . Thus, conclude that the sine is continuous everywhere.
- 4) Show that the cosine is continuous everywhere.

Morals: a) You reviewed the important angle addition formulae. b) You saw how to express any limit as a limit at 0. c) You saw that sine and cosine are continuous.