Question 14 (5 marks)

(a) The table below examines the values of $\dfrac{a^h - 1}{h}$ for various values of a as h approaches zero. Complete the table, rounding your values to five decimal places. (2 marks)

h	$a = 2.60$	$a = 2.70$	$a = 2.72$	$a = 2.80$
0.1	1.00265	1.04423	1.05241	1.08449
0.001	0.95597	0.99375	1.00113	1.03015
0.00001	0.95552	0.99326	1.00064	1.02962

It can be shown that $\dfrac{d}{dx}(a^x) = a^x \lim\limits_{h \to 0}\left(\dfrac{a^h - 1}{h}\right)$.

(b) What is the exact value of a for which $\dfrac{d}{dx}(a^x) = a^x$? Explain how the above definition and the table in part (a) support your answer. (3 marks)