1. $\displaystyle\lim_{x\to\frac{\pi}{4}}\log_2\left(2\sin(x)\right) =$

2. $\displaystyle\lim_{x\to 1}\frac{\sin(x-1)}{2-2x} =$

3. $\displaystyle\lim_{x\to 0}\frac{3-3\cos(x)}{\cos(x)-1} =$

4. This problem concerns the function $f(x) = \begin{cases} cx^2 + 2x, & \text{if } x < 2 \\ x^2 - cx, & \text{if } x \geq 2 \end{cases}$

Find the value(s) of c such that f will be continuous at all x. Show and explain your work.

1. $\displaystyle \lim_{x \to \frac{\pi}{6}} \log_2 \big(\sin(x) \big) =$

2. $\displaystyle \lim_{x \to \frac{\pi}{2}} \frac{\sin(x) - 1}{2 - 2\sin(x)} =$

3. $\displaystyle \lim_{x \to 1} \frac{\sin(x - 1)}{2 - 2x} =$

4.   This problem concerns the function $f(x) = \begin{cases} cx^2 + 2x, & \text{if } x < 2 \\ x^2 - cx, & \text{if } x \geq 2 \end{cases}$

Find the value(s) of c such that f will be continuous at all x. Show and explain your work.