1016-420-02
Complex Variables

In-Class Exercise Solutions

2012 November 29

1. Fill in the following table of values of $\mathrm{Arg}(x+iy) = \texttt{atan2}(y,x)$, defined to lie in the interval $(-\pi, \pi]$. (The ☹ indicates that the quantity cannot be defined.)

$\mathrm{Arg}(x+iy)$		x				
		$-\sqrt{3}$	-1	0	1	$\sqrt{3}$
y	$\sqrt{3}$	$3\pi/4$	$2\pi/3$	$\pi/2$	$\pi/3$	$\pi/4$
	1	$5\pi/6$	$3\pi/4$	$\pi/2$	$\pi/4$	$\pi/6$
	0	π	π	☹	0	0
	-1	$-5\pi/6$	$-3\pi/4$	$-\pi/2$	$-\pi/4$	$-\pi/6$
	$-\sqrt{3}$	$-3\pi/4$	$-2\pi/3$	$-\pi/2$	$-\pi/3$	$-\pi/4$

2. Fill in the following table of values of y/x (use a ☹ to indicate that the quantity cannot be defined).

y/x		x				
		$-\sqrt{3}$	-1	0	1	$\sqrt{3}$
y	$\sqrt{3}$	-1	$-\sqrt{3}$	☹	$\sqrt{3}$	1
	1	$-1/\sqrt{3}$	-1	☹	1	$1/\sqrt{3}$
	0	0	0	☹	0	0
	-1	$1/\sqrt{3}$	1	☹	-1	$-1/\sqrt{3}$
	$-\sqrt{3}$	1	$\sqrt{3}$	☹	$-\sqrt{3}$	-1

3. Fill in the following table of values of the principal arctangent of y/x, defined to lie in the interval $(-\pi/2, \pi/2)$ (use a ☹ to indicate that the quantity cannot be defined).

$\text{Arctan}(y/x)$		x				
		$-\sqrt{3}$	-1	0	1	$\sqrt{3}$
y	$\sqrt{3}$	$-\pi/4$	$-\pi/3$	☹	$\pi/3$	$\pi/4$
	1	$-\pi/6$	$-\pi/4$	☹	$\pi/4$	$\pi/6$
	0	0	0	☹	0	0
	-1	$\pi/6$	$\pi/4$	☹	$-\pi/4$	$-\pi/6$
	$-\sqrt{3}$	$\pi/4$	$\pi/3$	☹	$-\pi/3$	$-\pi/4$