1. a) $(u^2+(v+c)^2>c^2, v<0$ b) $(u-1/2)^2+v^2<(1/2)^2, v<0$.

4. c is real.

5. a) $(k+1/2)\pi+\frac{i}{2}\mathrm{L}og3$ b)

$$\tan^{-1}(1+i)=\frac{i}{2}\log(-1-2i)=\frac{i}{2}(\mathrm{Log}\sqrt{5}+\theta i+2k\pi i)=-\frac{1}{2}\theta-k\pi+\mathrm{Log}\sqrt{5}/2i,$$

$k=0,\pm1,\pm2,\cdots$, where $\cos\theta=-1/\sqrt{5}, \sin\theta=-2/\sqrt{5}$. c) $\cosh^{-1}(-1)=\log(-1)=(2k\pi+\pi)i$, $k=0,\pm1,\pm2,\cdots$.

d) $\tanh^{-1}(0)=1/2\log 1=\frac{1}{2}2k\pi i=k\pi i$, $k=0,\pm1,\pm2,\cdots$.

6. 15π.

7. a) $1+i/3$ b) $(1+i)\sinh 2$ c) $\frac{i}{12}[1-(1+2i)^6]=\frac{11}{3}-\frac{29i}{3}$ d) $\frac{1}{2i}-\frac{1}{8+2i}=-\frac{2}{17}-\frac{8i}{17}$.

8. a) $8\pi i$ b)$34\pi i$ c) $1/2+i$ d) $13/10+i/6$ e) $i(1-e^{-2\pi})$ f) 0 if $m\neq n-1$ and $2\pi i$ if $m=n-1$.