1. Find the quotient
$$\frac{(6+2j)-(1+3j)}{(-1+j)-2}.$$
2. Let k be an integer. Show that
   (a) $j^{4k}=1$,
   (b) $j^{4k+1}=j$,
   (c) $j^{4k+2}=-1$,
   (d) $j^{4k+3}=-j$.
3. Find
   (a) j^7,
   (b) j^{62},
   (c) j^{-202},
   (d) j^{-4321}.
4. Evaluate
$$3j^{11}+6j^3+\frac{8}{j^{20}}+j^{-1}.$$
5. Solve each of the following equations for z.
   (a) $jz=4-zj$,
   (b) $\frac{z}{1-z}=1-5j$,
   (c) $(2-j)z+8z^2=0$,
   (d) $z^2+16=0$.
6. Let $z=3-2j$. Plot the following points in the complex plane
   (a) z,
   (b) $-z$,
   (c) $\bar{z}$,
   (d) $-\bar{z}$,
   (e) $\frac{1}{z}$.
7. Find $\arg(1+\sqrt{3}j)$ and write $1+\sqrt{3}j$ in polar form.
8. Write the quotient
$$\frac{(1+j)}{(\sqrt{3}-j)}$$
in polar form.
9. Compute by using Euler's equation
   (a) $(1+j)/(\sqrt{3}-j)$,
   (b) $(1+j)^{24}$.
   Hint: Euler's equation
$$e^{jy}=\cos y+j\sin y$$
10. Prove De Moivre's formula
$$(\cos\theta+j\sin\theta)^n=\cos n\theta+j\sin n\theta,\quad n=1,2,3,...$$
for $(1+j)^{24}$.
11. Write $e^{-j\pi/4}$ in the form of $a+bj$.
12. Write $(1+j)^6$ in the polar form $re^{j\theta}$.
13. Solve
$$z^2-(3-2j)z+1-3j=0.$$
14. Prove that the function
$$f(z)=e^z=e^x\cos y+je^x\sin y$$
is entire, and find its derivative.
15. Construct an analytic function whose real part is
$$u(x,y)=x^3-3xy^2+y.$$