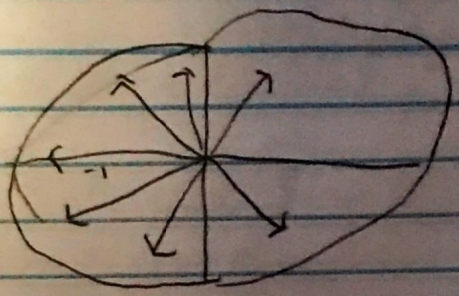
1) $z^7 = (-1, e^{\pi i}, e^{3\pi i}, e^{5\pi i}, e^{-3\pi i}, e^{-\pi i})^{\frac{1}{7}}$

$z = -1, -e^{\pi/7 i}, -e^{3\pi/7 i}, -e^{5\pi/7 i}, -e^{-3\pi/7 i}, -e^{-\pi/7 i}, -e^{-5\pi/7}$




2)

a) $1+i$ $\quad \sqrt{2} \angle 45$

b) $1-i$ $\quad \sqrt{2} \angle -45$

c) $5e^{i210} \rightarrow 5 \angle 210 \rightarrow -4.33 + -2.5i$

d) $5e^{-i210} \rightarrow 5 \angle -210 \rightarrow -4.33 + 2.5i$

e) $zz^* = (x+iy)(x-iy)$

$= x^2 + y^2$

f) $w = e^z \quad z = 1+i$

$\log w = 1+i$

$\sqrt{2} \angle 45$

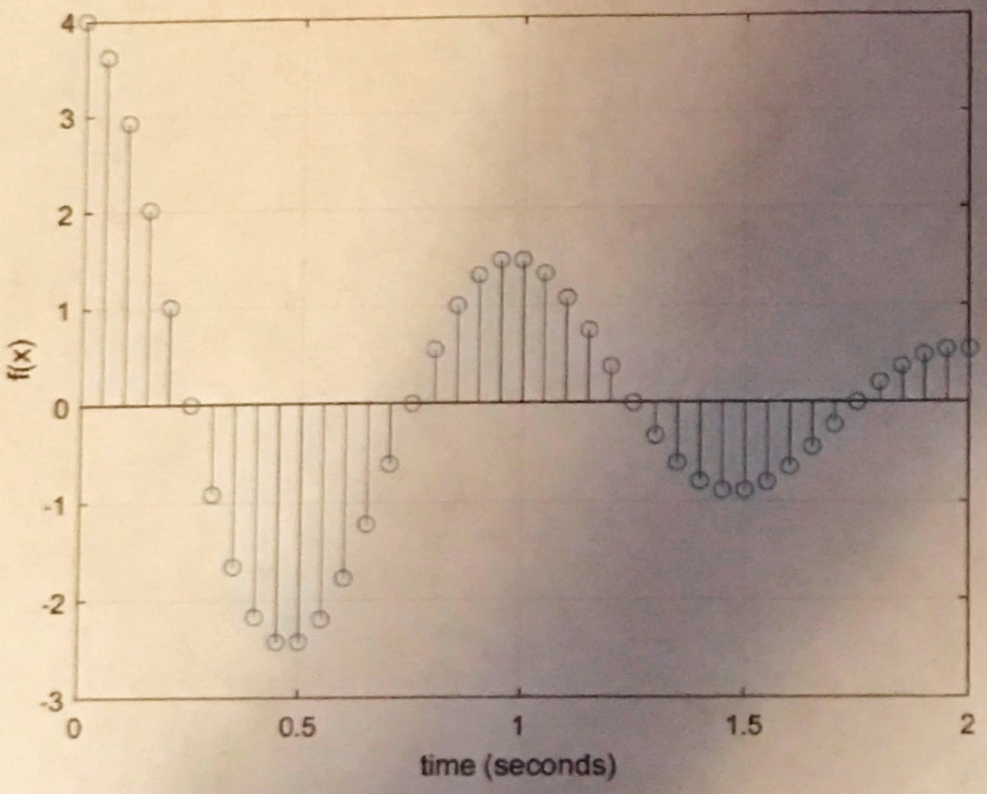
4.

```
t = 0:.05:2;
a = 4;
f = 2;

y = a * exp(-1 * t) .* cos(t * pi * f);

stem(t, y)
grid
xlabel('time (seconds)')
ylabel('f(x)')

saveas(gcf,'dampedSinusoid.png')
```



3.) $\sin(a+b) = \dfrac{e^{i(a+b)} - e^{-i(a+b)}}{2i}$

$\dfrac{e^{ia+ib} - e^{-ia-ib}}{2i}$

$\cos a \sin a (\cos b)(\sin b) - \cos a - i \sin a (\cos b - i \sin b)$

$2i \dfrac{\cos a \sin b + 2i \sin a \cos b}{2i}$

$\cos a \sin b + \sin a \cos b$

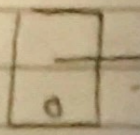
$\cos(a+b) = e^{ia+ib} + e^{-ia-ib}$

$(\cos a + \sin a)(\cos b + \sin b) + (\cos a - i \sin a)(\cos b - i \sin b)$

$\cos a \sin b - \sin a \sin b$

5.

a.)




$X = 3\cos(-90) = 0\ V$

$Y = 3\sin(-90) = -3\ V$

b) $X = 3\cos(-180) = -3V$

$Y = 3\sin(-180) = 0V$