HOMEWORK #1

Problem 1. Working in $\mathbb{C}$, compute the following:

(a) $(3+i2)(2-i)$
(b) $\left(\frac{2}{3}+i\frac{1}{2}\right)\left(\frac{1}{2}+i\frac{3}{2}\right)$
(c) $(3+i2)\overline{(3+i2)}$
(d) $\left(2\left(\cos\left(\frac{\pi}{3}\right)+i\sin\left(\frac{\pi}{3}\right)\right)\right)\left(5\left(\cos\left(\frac{\pi}{3}\right)+i\sin\left(\frac{\pi}{3}\right)\right)\right)$

Problem 2. Working in $\mathbb{C}$, find all solutions for z.

(a) $(2+i3)z=i$
(b) $z^4=16$
(c) $z^2=-4$

Problem 3. Working in $\mathbb{Z}_5$, find all solutions for x. As there are at most 5 possible solutions, it may be fastest to plug in all possible values for z and see which ones work. Only find solutions between (and including) 0 and 4.

(a) $3z+1=2$
(b) $z^4=3$
(c) $z^2=4$

Problem 4.

(a) In $\mathbb{Z}_5$ solve for y :

$$2x+3y=1$$

How many solutions are there? (Only count solutions where both x and y are between 0 and 4.)

(b) In $\mathbb{Z}_7$ solve for y :

$$2x+3y=1$$

How many solutions are there? (Only count solutions where both x and y are between 0 and 6.)