Tarea 1: Operaciones con Numeros Complejos

Sean $z_1 = 5+2i$ $z_2 = 8+4i$ $z_3 = -1 - \frac{5}{3}i$

$z_4 = -1+3i$ $z_5 = \frac{2}{3} - \frac{1}{2}i$

Realizar las siguientes operaciones, utilizando la representacion mas adecuada.

1) $z_3 + z_6 =$

$\left(-1 - \frac{5}{3}i\right) + \left(\frac{2}{3} - \frac{1}{2}i\right) = \left(-1 - \frac{5}{3}i + \frac{2}{3} - \frac{1}{2}i\right)$

$= \left(-1 + \frac{2}{3}\right) + \left(-\frac{5}{3}i - \frac{1}{2}i\right) =$ [illegible]

2) $\frac{1}{2}z_2 + 2z_4 =$

$\frac{1}{2}(8+4i) + 2(-1+3i)$

$4 + 2i - 2 + 6i = \boxed{2+8i}$

3) $z_4 \cdot z_1 = (-1+3i)(5+2i) = -5 - 2i + 15i + 6i^{2(-1)}$

$= -5 - 2i + 15i - 6 = \boxed{-11 + 13i}$

4) $z_5(z_1 + z_4) = \left(\frac{2}{3} - \frac{1}{2}i\right)((5+2i) + (-1+3i))$

$= \left(\frac{2}{3} - \frac{1}{2}i\right)(4+5i)$

$= \frac{8}{3} - \frac{4}{2}i + \frac{10}{3}i - \frac{5}{2}i^2$

$= \frac{8}{3} - \frac{4}{2}i + \frac{10}{3}i + \frac{5}{2}$

$= \boxed{\frac{31}{6} + \frac{4}{3}i}$

5) $\frac{z_1}{z_4} = \frac{5+2i}{-1+3i} \cdot \frac{(-1+3i)}{(-1+3i)} = \frac{-5+15i-2i-6}{(1-9)} \quad (1+9)$

$= \frac{1}{10} - \frac{17i}{10} = \boxed{\frac{1}{10} - \frac{17}{10}i}$

6) $\frac{z_4 \cdot z_1}{z_3 + z_5} = \frac{(-1+3i)(5+2i)}{(-1+\frac{5}{3}i)+(\frac{3}{5}-\frac{1}{2}i)} = \frac{-11+13i}{-\frac{1}{3}-\frac{13}{6}i}$

- $\frac{(-\frac{1}{3}+\frac{13}{6}i)}{(-\frac{1}{3}+\frac{13}{6}i)} = \frac{\frac{11}{3}-\frac{143}{6}i+\frac{13}{3}i+\frac{169}{6}i^2(-1)}{(-\frac{1}{3})^2+(\frac{13}{6}i)^2(-1)}$

$= \frac{-\frac{49}{2}-\frac{169}{6}i}{\frac{1}{9}+\frac{13}{6}} = \frac{-\frac{49}{2}-\frac{169}{6}i}{\frac{41}{18}}$

$= \left(\frac{\frac{49}{2}}{\frac{41}{18}}\right) - \left(\frac{\frac{169}{6}}{\frac{41}{18}}\right)i = \frac{882}{82} - \frac{3042}{246}i$

$\boxed{-\frac{441}{41} - \frac{507}{41}i}$