Standard 2 Review:

Name: Key

1. **Find the following powers of *i*.**

   a. i^2 $= -1$

   b. i^{25} i

   c. i^{126} -1

   d. i^{47} $-i$

2. **Write the following as complex numbers in standard form.**

   a. $\sqrt{-100}$ $0+10i$

   b. $2+\sqrt{-36}$ $2+6i$

   c. $-3-\sqrt{-28}$ $-3-2i\sqrt{7}$

   d. $\sqrt{-3}\bullet\sqrt{-12}$ -6

3. **Simplify and write the following as complex numbers in standard form.**

   a. $(4+2i)+(7-5i)$ $11-3i$

   b. $(6-3i)-(4-9i)$ $2+6i$

   c. $2(3-9i)$ $6-18i$

   d. $5i(6+3i)$ $-15+30i$

   e. $(6+5i)(6-5i)$ 61

   f. $(1-5i)(3+4i)$ $23-11i$

4. **Simplify the following complex numbers.**

   a. $\dfrac{4+10i}{2-7i}$ $\dfrac{-62+48i}{53}$

   b. $\dfrac{3+6i}{2+3i}$ $\dfrac{24+3i}{13}$

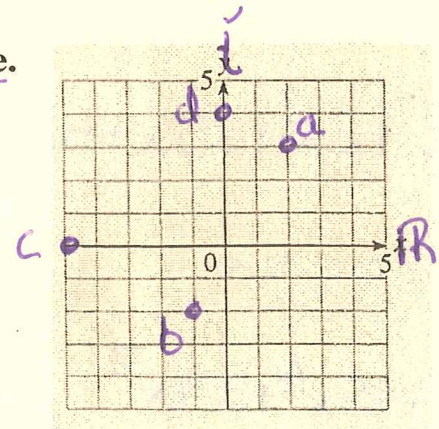
5. **Graph the following numbers on the complex plane.**

   a. $2+3i$

   b. $-1-2i$

   c. -5

   d. $4i$



6. Find all the factors and all the roots of each polynomial

a. $f(x) = x^2 + 4x + 8$

$x = -2 \pm 2i$

b. $f(x) = x^2 - 2x + 10$

$x = 1 \pm 3i$

c. $f(x) = 3x^3 + 27x$

$3x(x+3i)(x-3i) = 0$

$x = 0, \pm 3i$

d. $f(x) = x^4 - 1296$

$(x+6)(x-6)(x+6i)(x-6i) = 0$

$x = \pm 6 \quad x = \pm 6i$

e. $f(x) = x^4 + 41x^2 + 400$

$(x+5i)(x-5i)(x+4i)(x-4i) = 0$

$x = \pm 5i \quad x = \pm 4i$

f. $f(x) = x^3 + 3x^2 + 16x + 48$

$(x+4i)(x-4i)(x+3) = 0$

$x = \pm 4i \quad x = -3$

g. $f(x) = x^3 - 2x^2 + 36x - 72$
(hint: $6i$ is a root)

$(x+6i)(x-6i)(x-2) = 0$

$x = \pm 6i \quad x = 2$

h. $f(x) = x^3 - 3x^2 - 15x + 125$
(hint: $4 - 3i$ is a root)

$(x-4+3i)(x-4-3i)(x+5)$

$x = 4 \pm 3i \quad x = -5$

7. Find a polynomial with the following zeros

a. $-2, 5i$

$x^3 + 2x^2 + 25x + 50$

b. $4, -4, 4i,$

$x^4 - 256$

c. $0, 0, -3i, 6i$

$x^6 + 45x^4 + 324x^2$

d. $3, 7 + 2i$

$x^3 - 17x^2 + 95x - 159$