Números complejos

1. i. a. $3 - 6i$ b. $1 + \frac{5}{2}i$ c. $\frac{9}{2} + 4i$ d. $2 + i$

3. a. Las longitudes de sus diagonales son: 2 y $\sqrt{20}$.

4. a. $S = \{1, 2\}$

b. $S = \left\{-2,\ 1+\sqrt{3}i,\ 1-\sqrt{3}i\right\}$

c. $S = \left\{\sqrt[4]{2}e^{\frac{5}{12}\pi i},\ \sqrt[4]{2}e^{\frac{11}{12}\pi i},\ \sqrt[4]{2}e^{\frac{17}{12}\pi i},\ \sqrt[4]{2}e^{\frac{23}{12}\pi i}\right\}$

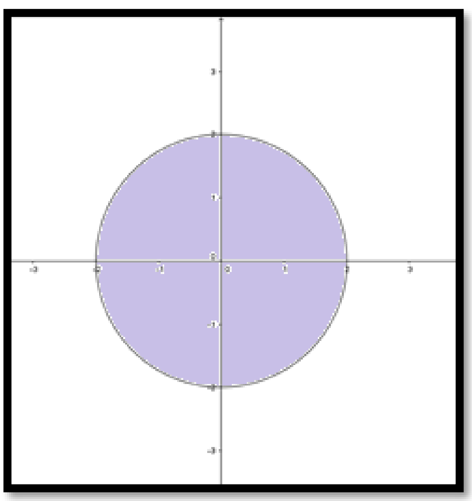
d. $S = \left\{\sqrt[12]{2}e^{\frac{\pi}{24}i},\ \sqrt[12]{2}e^{\frac{3}{8}\pi i},\ \sqrt[12]{2}e^{\frac{17}{24}\pi i},\ \sqrt[12]{2}e^{\frac{25}{24}\pi i},\ \sqrt[12]{2}e^{\frac{11}{8}\pi i},\ \sqrt[12]{2}e^{\frac{41}{24}\pi i}\right\}$

e. $S = \{3, 3i, -3, -3i\}$

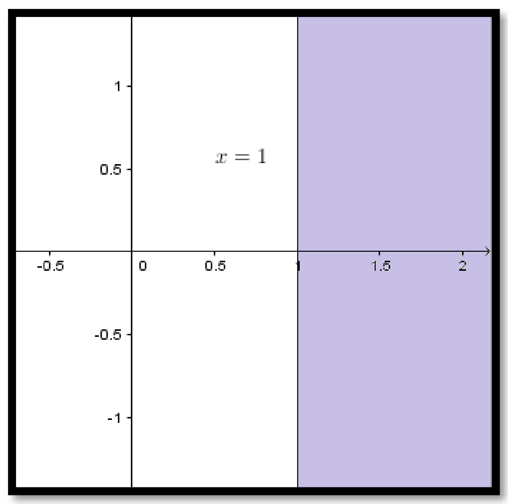
f. $S = \{-2, 2, 1+2i, 1-2i\}$

5.

a.

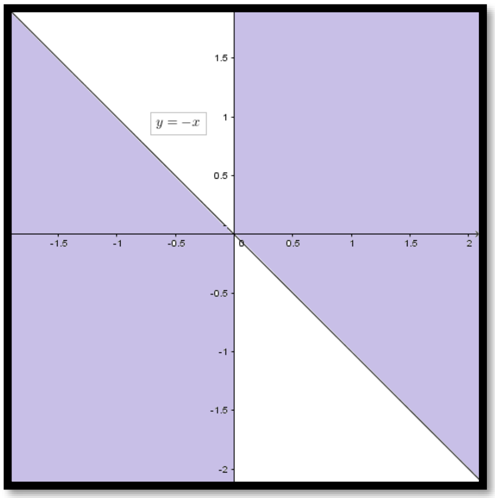


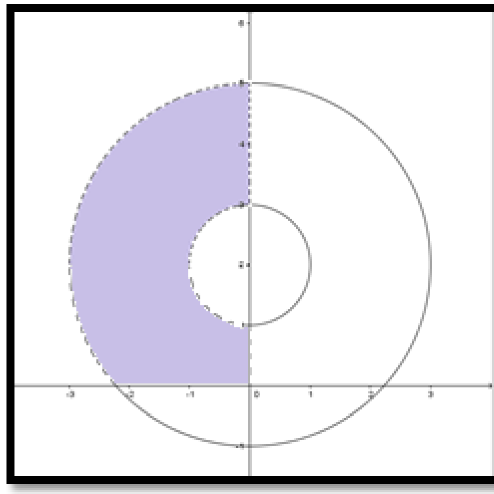
b.



c.

d.





6.

a. R= $\{z \in C: Re(z) \leq 3,\ Im(z) \leq 2\}$

b. R= $\{z \in C: Re(z) \leq Im(z),\ Re(z) \geq 0,\ Im(z) \leq 4\}$

c. R = $\{ z \in C:\ \frac{\pi}{4} \leq \arg(z) \leq \frac{7}{4}\pi\ \wedge\ |z| \leq 2 \}$

<u>Polinomios</u>

8. i. $p(x) + r(x) = -x^3 + 6x - 2$ ii, $q(x) - r(x) = x^3 + x^2 - 5x + 3$ iii. $p(x)q(x) = x^3 + x$ iv. $p(x)+2r(x)-q(x) = -2x^3 - x^2 + 11x - 5$

9. i. a) $\sigma(p_1) = \{-1, 0, 1\}$ b) En Q[t], R[t] y C[t]: $p_1(t) = t(t-1)(t+1)$

ii. a) $\sigma(p_2) = \{0(\text{doble}), 1\}$ b) En Q[t], R[t] y C[t]: $p2(t) = -t^2(t-1)$

iii. a) $\sigma(p_3) = \{-\sqrt{2},\ \sqrt{2},\ \sqrt{2}i,\ -\sqrt{2}i\}$

b) En Q[t]: $p_3(t) = (t^2 - 2)(t^2 + 2)$

En R[t]: $p_3(t) = (t - \sqrt{2})(t + \sqrt{2})(t^2 + 2)$

En C[t]: $p_3(t) = (t - \sqrt{2})(t + \sqrt{2})(t - \sqrt{2}i)(t + \sqrt{2}i)$

iv. a) $\sigma(p_4) = \{-3, -2, 0, 2, 3\}$ b) En Q[t], R[t] y C[t]: $p_4(t) = t(t-2)(t+2)(t-3)(t+3)$

v. a) $\sigma(p_1 + p_2) = \{0, 1\}$ b) En Q[t], R[t] y C[t]: $(p_1 + p_2)(t) = t(t-1)$

vi. a) $\sigma(p_1 p_2) = \{0(\text{triple}), 1(\text{doble}), -1\}$ b) En Q[t], R[t] y C[t]: $(p_1 p_2)(t) = -t^3(t-1)^2(t+1)$

10. a. $a = \frac{1}{5},\ \sigma(p) = \{2, -1\}$

b. $a = -\frac{253}{6},\ b = \frac{223}{3}$

c. a = -16, b = 12.

11 a. $c(w) = w$, $r(w) = 25w^2 - 1$

b. $c(u) = 0$, $r(u) = u^3 - 25u$

c. $c(t) = t^4 - t^2 + t + 1$, $r(t) = -t^2 + 2t - 1$

d. $c(t) = t^6 + t^4 + t^2 + 1$, $r(t) = 0$.

e. c(x) = 3x + 15, r(x) = 0

12

a. $p(t) = \frac{1}{9}(t+3)(t+1)(t-1)(t-3)$

b. $q(t) = \frac{1}{48}(t+3)^2(t+2)t^2(t-2)^2(t-3)$

c. $r(t) = \frac{1}{4}(t+2)(t+1)^2(t-1)^2(t-2)$

d. $s(t) = -\frac{1}{9}(t+2)^2(t+1)t^2(t-2)^2$

13

i. En R[t] y C[t]: $p(t) = (t-1)^2(t-2)(t-3)$

ii. En R[t]: $p(t) = (t^2-2t+5)(t-1)(t-2)$ En C[t]: $p(t) = (t-(1+2i))(t-(1-2i))(t-1)(t-2)$

iii. En R[t] y C[t]: $p(t) = t(t-1)(t+1)(t-2)(t+2)$

iv. En R[t] y C[t]: $p(t) = t(t-1)(t-2)(t-3)(t-4)$

v. En R[t]: $p(t) = -2.(t^2+4)(t-3)$ En C[t]: $p(t) = -2.(t-2i)(t+2i)(t-3)$

vi. En R[t] y C[t]: $p(t) = -3t^3(t+2)^2(t-2)^2$