

Problem 1

1. $F(2i) = 0$
2. $b = -4$, $c = 4 + 2i$
3. Since $a = 1$, $b = -4$ and $c = 4 + 2i$, then the discriminant $= -8i = 8\text{cis}(3\pi/2)$
4. $\sqrt{8\text{cis}(\frac{3\pi}{2})} = 2 \pm \sqrt{2}\text{cis}(\frac{3\pi}{4}) = 2 \pm (-1 + i)$
5. $z_1 = 2i$, $z_2 = 1 + i$, $z_3 = 3 - i$ so line is $(a, b) = (0, 2) + t\langle -1, 1 \rangle$

Problem 2

1. $F(-i) = 2$
2. You have to do a bunch of algebra
3. E = all points on a circle of radius 1 centered at the origin
4. F = a disc of radius 1 centered at $(1, 1)$
5. $\sqrt{13}\text{cis}(303.69^\circ) = \sqrt{13}\text{cis}(5.3)$

Problem 3

1. $y = -x + 1$
2. Notice that z_1 and z_2 make the magnitude in the original equation zero.
3. $-1 + 2i$
4. Remember how to find a perpendicular line through a midpoint.
5. Again, $y = -x + 1$