#s 1 – 3 Multiply (expand) and simplify.

1. $(x-3i)(x+3i)$
2. $\left(x-\left(1+\sqrt{2}\right)\right)\left(x-\left(1-\sqrt{2}\right)\right)$
3. $(x-(3+2i))(x-(3-2i))$

#s 4 – 7 Find a polynomial in factored form that will have real coefficients when expanded (multiplied out) and has the zeros described. Do *not* expand.

4. $x=-3;\ x=5$
5. $x=0;\ x=i\sqrt{3}$
6. $x=3;\ x=1-i$
7. $x=\frac{1}{2};\ x=\frac{1}{3};\ x=\frac{1}{4}$

#s 8 – 10 Use Descartes' Rule of Signs to determine the possible number of positive and negative zeros

8. $f(x)=x^3+5x^2+7x+1$
9. $f(y)=y^4+5y^2+7$
10. $f(x)=x^5+x^3+5x$

#s 11 - 15 Use the Theorems you have, thus far, to find all real and nonreal roots of the given polynomial. Then *split the polynomial into linear factors* (I.e., Factor over the complex numbers.).

11. $x^3-4x^2-7x+10$
12. $x^4+2x^3-7x^2+2x-8$
13. $6x^3+25x^2-25x+5$
14. $x^4+2x^3-3x^2-4x+4$
15. x^5+3x^3+2x

It's good practice to sketch these, once you have them factored. This is an option for a student wanting more practice.