Precalculus
2.5 Homework

Use the Remainder Theorem to find the remainder when $f(x)$ is divided by $x-c$. Then use the Factor Theorem to determine whether $x-c$ is a factor of $f(x)$.

1. $f(x)=4x^3-3x^2-8x+4;\ x-2$
2. $f(x)=3x^6+82x^3+27;\ x+3$
3. $f(x)=2x^4-x^3+2x-1;\ x-\frac{1}{2}$
4. $f(x)=4x^6-64x^4+x^2-15;\ x+4$

List the potential rational zeros of each polynomial function. DO NOT ATTEMPT TO FIND THE ZEROS!

5. $f(x)=3x^4-3x^3+x^2-x+1$
6. $f(x)=-4x^3-x^2+x+2$
7. $f(x)=6x^4-x^2+9$
8. $f(x)=6x^4+2x^3-x^2+20$

Use the Rational Zeros Theorem to find all the REAL zeros of each polynomial function. Use the zeros to factor *f* over the REAL numbers.

9. $f(x)=x^3+2x^2-5x-6$
10. $f(x)=x^4+x^3-3x^2-x+2$
11. $f(x)=2x^4+x^3-7x^2-3x+3$
12. $f(x)=4x^4+5x^3+9x^2+10x+2$

Solve the equation in the real number system.

13. $3x^3+4x^2-7x+2=0$
14. $3x^3-x^2-15x+5=0$

Information is given about a polynomial function *f* whose coefficients are real numbers. Find the remaining zeros of *f*.

15. Degree 4; zeros: $i,\ 1+i$
16. Degree 5; zeros: $1,\ i,\ 2i$
17. Degree 6; zeros: $2,\ 2+i,\ -3-i,\ 0$

Find a polynomial function *f* with real coefficients having the given degree and zeros. YOU MUST MULTIPLY OUT YOUR ANSWER. DO NOT LEAVE IT IN FACTORED FORM!

18. Degree 4; zeros: $3+2i$; 4, multiplicity 2
19. Degree 5; zeros: $2;\ -i;\ 1+i$

Use the given zero to find the remaining zeros (REAL AND IMAGINARY) of the function.

20. $f(x)=2x^4+5x^3+5x^2+20x-12;$ zero: $-2i$
21. $f(x)=x^4-9x^3+21x^2+21x-130;$ zero: $3-2i$

Find the COMPLEX zeros of the polynomial function. Write *f* in factored form.

22. $f(x)=x^3-1$
23. $f(x)=x^3-8x^2+25x-26$
24. $f(x)=x^4+2x^3+22x^2+50x-75$
25. $f(x)=3x^4-x^3-9x^2+159x-52$