Name: _____ Date: _____

PCH: Polynomials Practice

1. If $f(x) = 6x^3 - 5x^2 - 17x + 6,$ find $f\left(\frac{1}{2}\right).$

2. If $f(x) = 2x^3 + 5x^2 + 5px + 6$ and $f(2) = 12,$ find $p.$

3. Find the quotient and remainder when $3x^3 + x^2 - 6x + 3$ is divided by $3x + 1.$

4. If f is a polynomial where $f(3) = 0$ and $f(-1) = 0,$ what are two linear factors of f?

5. Find the zeros of:

(a) $f(x) = x(x+2)(3x-4)$

(b) $g(x) = 3x^2 - 9x$

(c) $h(x) = 3x^2 - 9x + 7$

(d) $j(x) = x^2 + 9$

6. If $x+3$ is a factor of $f(x) = x^3 + 4x^2 + x - 6,$ find the complete factorization of $f(x)$.

7. Given: $g(x) = 2x^4 - 7x^3 - 6x^2 + 44x - 40$

   (a) Find the multiplicity of the zero 2.
   (b) Factor $g(x)$ completely using integral factors.
   (c) Find the roots of $g(x) = 0$.

8. One root of $x^3 + 4x^2 - 4x - 1 = 0$ is 1. Find the other roots.

9. $F(x)$ is a polynomial function with rational coefficients. What is the minimum degree of $F(x)$ if $\sqrt{2}, 1, 1 - \sqrt{2}$ and 3 are zeros of $F(x)$?

10. True of False: If $2i$ is a root of $x^2 - ix + 2 = 0,$ then $-2i$ is also a root.

11. Find a polynomial $P(x)$ in expanded form with integral coefficients if its zeros are: $\left\{-1, \pm i, \frac{3}{4}(\text{multiplicity of } 2)\right\}$.

12. Find the remainder when $x^{125} - 5x^{77} + 2x^{46} - 3x + 5$ is divided by $x + 1$.