

## Zeros of a Polynomial

Determine whether the given binomial is a factor of the polynomial  $p(x)$ . If so, find the remaining factors of  $p(x)$ .

12.  $p(x) = x^3 + 2x^2 - x - 2, (x+2)$

13.  $p(x) = 2x^4 + 6x^3 - 5x - 10, (x+2)$

$$\begin{array}{r} -2 \overline{) 2 \quad 6 \quad 0 \quad -5 \quad -10} \\ + \downarrow \quad -4 \quad -4 \quad 8 \quad -6 \\ \hline 2 \quad 2 \quad -4 \quad 3 \quad -16 \end{array} \leftarrow R \neq 0$$

$(x+2)$  is Not a factor

14.  $p(x) = x^3 - 22x^2 + 157x - 360, (x-8)$

15.  $p(x) = 4x^3 - 12x^2 + 2x - 5, (x-3)$

$$\begin{array}{r} 8 \overline{) 1 \quad -22 \quad 157 \quad -360} \\ + \downarrow \quad 8 \quad -112 \quad 360 \\ \hline 1x^2 \quad -14x \quad +45 \quad 0 \end{array} \quad \boxed{(x-8) \text{ is a factor}}$$

$(x-9)(x-5)$  other factors

Find all the zeros and factors of the following polynomials

1.  $f(x) = x^3 - x^2 - 10x - 8$

3.  $f(x) = 2x^3 - x^2 - 13x - 6$

$$x = -1, -0.5, 3$$

$$(x+1)(x+0.5)(x-3)$$

4.  $g(x) = x^3 - 9x^2 + 23x - 15$

$$x = 1, 3, 5$$

$$(x-1)(x-3)(x-5)$$

6.  $h(x) = 6x^3 - 7x^2 - 9x - 2$



10.  $g(x) = x^4 - 6x^3 + 11x^2 - 6x$

12.  $g(x) = x^4 - 5x^2 + 4$

$x = -2, -1, 1, 2$

$(x+2)(x+1)(x-1)(x-2)$

13.  $f(x) = x^3 - 4x^2 - 11x + 2$

$x = -2, 0.17, 5.83$

$(x+2)(x-0.17)(x-5.83)$

14.  $f(x) = x^3 - 4x^2 + 2x + 4$

17. Identify the zeroes of
- $f(x) = (x+3)(x-4)(x-3)$
- , write the function in standard form, and state how the zeros are related to the standard form.

zeros:  $x = -3, 4, 3$

$(x+3)(x-4)(x-3) = (x^2 - 4x + 3x - 12)(x-3)$

$(x^2 - x - 12)(x-3) = x^3 - 3x^2 - x^2 + 3x - 12x + 36$

The # of zeros matches the degree of the polynomial

Standard Form:  $x^3 - 4x^2 - 9x + 36$

19. Explain the Error Sabrina was told to find the zeros of the polynomial function

$h(x) = x(x-4)(x+2)$ . She stated that the zeros of this polynomial are  $x = 0$ ,

 $x = -4$ , and  $x = 2$ . Explain her error.