Unit 11: Polynomial functions

(Chapter 11, page 479)

End behavior in this chapter.

- End behavior of polynomials.
- Zeros of polynomials.
- Factoring polynomials into n-roots.
- Complex roots come in conjugate pairs.

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☐	Polynomial expression $P(x)$ ---- Term, coefficient, degree of term, degree of polynomial ---- Leading coefficient ---- Zero of $P(x)$ ---- Example:	
☐	Polynomial equation $P(x) = 0$ ---- Root of $P(x)$	
☐	Classifications: ---- Constant, Linear, Quadratic, Cubic ---- Monomial, Binomial, Trinomial	
☐	$$P(x) \div D(x) = Q(x) + \frac{R(x)}{D(x)}$$ or equivalently: $$P(x) = D(x) \cdot Q(x) + R(x)$$ ---- Dividend, Divisor, Quotient, Remainder	Page 482
☐	If $P(x) \div D(x)$ has a remainder of zero, than ________ is a factor of _______.	Page 481
☐	Factors and Zeros	
☐	---- Example: $$P(x) = x^3 - 3x^2 - x + 3$$ $x = 3$ is one zero. Find all the zeros.	

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☐	-- Polynomial of degree 'n' has 'n' zeros -- Polynomial of degree 'n' can be factored into 'n' linear factors -- Multiplicity of a factor -- Complex roots come in conjugate pairs (<-- polynomial with real coefficients) -- Division by $(x - x_1)$, where x_1 is a root, leaves no remainder (Theorem 11-2 through 11-5) ---- Examples: We have done MANY in class. See the worksheets, and put one here

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☐	Remainder theorem ---- Example:	Theorem 11-1
☐	Rational roots theorem ---- Example:	Theorem 11-7
☐	Descarte's rule of signs ---- And for negative real roots: $P(-x)$ ---- Example:	Theorem 11-8

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	Graphing	
☐	---- End behavior: determined by order of polynomial and sign of leading coefficient ---- Real roots represent x intercepts ---- Linear factors of multiplicity 1 represent line crossing the x-axis ---- Linear factors of multiplicity 2 represent parabola touching the x-axis ---- Complex roots do not represent x-axis crossing ---- There are no additional x-axis intercepts to these indicated by the real roots -------------------- Examples:	

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