1.1) Use long division if you are unsure about synthetic or not a monic linear binomial divisor. \( (bx-a) \quad b = 1 \) for long or syn, pad missing powers "placeholders" we need div to factor higher order polynomials and to calculate SA.

**1.2** Remainder Theorem (for \( x-a \)) \( a \in \mathbb{R} \)
Use \( P(a) \) to calc remainder. \( \checkmark \)
\( \text{eg: } P(x) = x^3 + 2x^2 - 5x + 9 \)
\( P(1) = 1 + 2 - 5 + 9 = 7 \) is rem.
\( P(-1) = -1 + 2 + 5 + 9 = 15 \) is rem.
Use this mostly for Factor Theorem \( P(a) = 0 \), so \( x-a \) is a factor of \( P(x) \). Don't want to do division to find factors. Then use division to reduce polynomial to find more factors.
Use Factor Property to find potential 'a's. Start with the small factors. \( a_0 \in \mathbb{Z} \) - constant term
Use substitution when solving problems such as:
Find \( k \) when \( P(x) = x^3 + kx^2 - 3x + 5 \), \( P(1) = 0 \)
Recall: Polynomial is \( P(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \ldots + a_0 \)

1.3) Recall different odd/even definitions:
- Numbers, degree, multiplicity, functions.
  - Multiplicity - # of times a root is repeated
  - Even (bounces), odd (goes thru) \( X \)-axis

\( (x-3)^2 \quad (x+2)^5 \)

- Degree - exponent of term with highest power
  - Even \((a_n > 0 \quad \text{CU, } a_n < 0 \quad \text{CD})\) leading coeff
  - Odd \((a_n > 0 \quad \text{III} \rightarrow \text{I}, a_n < 0 \quad \text{II} \rightarrow \text{IV})\)
- Degree is > # of hills & valleys.
Also when graphing, graph \( y \)-int \((x=0)\), and \( x \)-ints (if easy)
When using calculator, domain: use \([-la_0, la_0]\) (because factor prop)
1.4) **Local/Global Min/Max** - # < degree.  
   Functions - we're not solving (zeroes)  
   Equations - we're solving (roots)  

1.5) Know your formulas - review on your own.  
   Read carefully / highlight keywords.  
   Use answer as variable.  
   Create a function with relations (formulas)  
   - Substitute variable into relations.  
   
   **Box**  
   \[ V = \ell w h \]  
   \( \ell = \frac{3}{2} w + 5 \)  
   \( h = \frac{4}{5} w - 4 \)  
   Substitute  
   \[ V = \left( \frac{3}{2} w + 5 \right) w \left( \frac{4}{5} w - 4 \right) \]  
   Should only have one variable