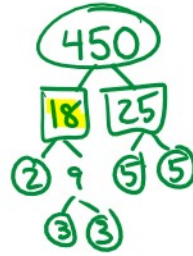


$$\frac{2x^3 + 2x^2 - 72x - 72}{(x+6)} = 2x^2 - 10x - 12$$

$2(x^2 - 5x - 6)$   
 $2(x-6)(x+1)$

FACTORIZING / QUADRATIC FORMULA / LONG DIVISION



$x^2 - 4 \leftarrow$  quotient  
 $x^2 - 2x - 15 \leftarrow$  divisor (3 terms)  
 $x^4 - 2x^3 - 19x^2 + 8x + 60 \leftarrow$  function  
 $0 \leftarrow$  remainder

$$\begin{array}{r} 517 \text{ R } 6 \\ 12 \overline{) 6210} \\ \underline{-60} \phantom{0} \\ 21 \phantom{0} \\ \underline{-12} \phantom{0} \\ 90 \\ \underline{-84} \\ 6 \end{array}$$

$$f(x) = x^4 - 2x^3 - 19x^2 + 8x + 60$$

$$(x^2 - 2x - 15)(x^2 - 4)$$

$$(x-5)(x+3)(x+2)(x-2)$$

$x=5 \quad x=-3 \quad x=-2 \quad x=2$

Two Rules of Long Division:

- ① The function and divisor must both be written in numerical exponent order  
 greatest exponent 1st ..... constant term Last
- ② You must insert **zero place holders** for any missing powers of  $x$  (including constant term) for both function and divisor

$$\begin{array}{r} 3x^4 - 2x^3 - 4x^2 + 4x + 3 \text{ R } -2 \\ x-2 \overline{) 3x^5 - 8x^4 + 0x^3 + 12x^2 - 5x - 8} \\ \underline{-3x^5 + 6x^4} \phantom{0} \\ \phantom{3x^5} -2x^4 + 0x^3 \phantom{0} \\ \phantom{3x^5} \underline{+2x^4 - 4x^3} \phantom{0} \\ \phantom{3x^5} \phantom{-2x^4} +4x^3 \phantom{0} \\ \phantom{3x^5} \phantom{-2x^4} \underline{+4x^3 + 12x^2} \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} +8x^2 \phantom{0} \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \underline{+4x^2 - 5x} \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \phantom{+4x^2} -5x - 8 \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \phantom{+4x^2} \underline{-4x^2 + 8x} \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \phantom{+4x^2} \phantom{-4x^2} +8x - 8 \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \phantom{+4x^2} \phantom{-4x^2} \underline{-3x + 6} \\ \phantom{3x^5} \phantom{-2x^4} \phantom{+4x^3} \phantom{+4x^2} \phantom{-4x^2} \phantom{-3x} -2 \end{array}$$