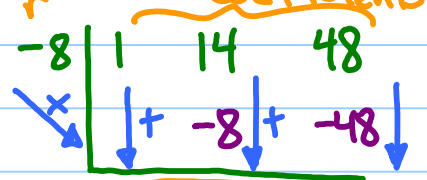


2.4 (part 2) ... Synthetic Division $(x-r)$ ~~$-8 \mid 1 \mid 14 \mid 48$~~

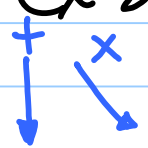
ex 1) $(x^2 + 14x + 48) \div (x+8)$



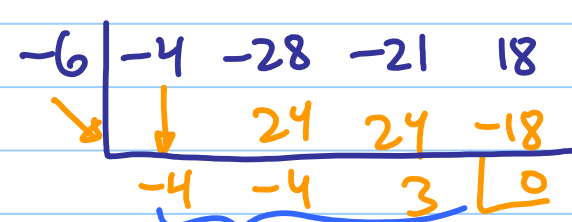
... x^3 ... x^2 ... x ... c
 $q(x) = x + 6$
 remainder $\rightarrow (x+8)$ is a factor of the polynomial

roots, x-ints, zeros
 * Add
 * Mult

ex 2) $\frac{-4x^3 - 28x^2 - 21x + 18}{x+6}$



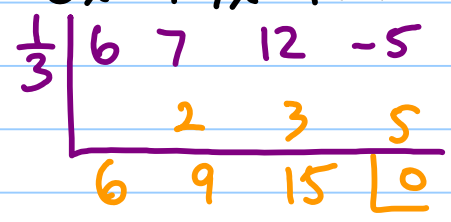
$x+6$
 Synth \div OK



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

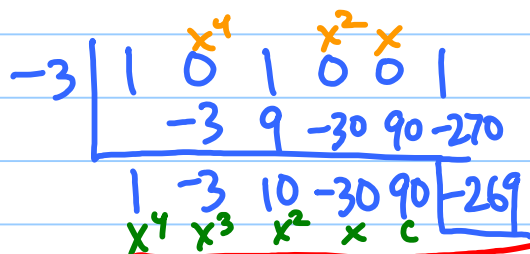
ex 3) Divide $3x-1$ into $6x^3 + 7x^2 + 12x - 5$

$3x-1=0$
 $x = \left(\frac{1}{3}\right)r$



$6x^2 + 9x + 15$ or $3(2x^2 + 3x + 5)$

ex 4) $\frac{x^5 + x^3 + 1}{x+3}$



$x^4 - 3x^3 + 10x^2 - 30x + 90 - \frac{269}{x+3}$

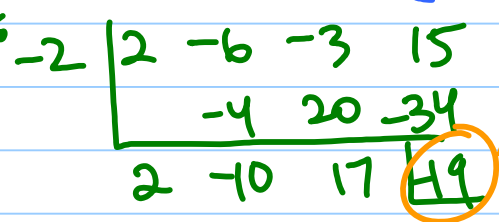
Remainder Theorem

ex 5) $f(x) = 2x^3 - 6x^2 - 3x + 15$. Find $f(-2)$

$f(-2) = 2(-2)^3 - 6(-2)^2 - 3(-2) + 15$
 $= -16 - 24 + 6 + 15 = -19$

$r = -2$
 UGH! 😞

Synth \div



remainder is also $f(r)$

ex 6) Use Synthetic \div to find all zeros...

$$(f(x) = x^3 + 15x^2 + 71x + 105) \div (x+7)$$

root! (-7)

$$\begin{array}{r|rrrr} -7 & 1 & 15 & 71 & 105 \\ & & -7 & -56 & -105 \\ \hline & 1 & 8 & 15 & 0 \end{array}$$

$$x^2 + 8x + 15 = 0$$

$$(x+3)(x+5) = 0$$
$$\begin{array}{l} x+3=0 \\ x=-3 \end{array} \quad \begin{array}{l} x+5=0 \\ x=-5 \end{array}$$

Checkpoint

Find all the zeros.

$$x^3 - 5x^2 + 2x + 8 = 0; \quad 2 \text{ root}$$

Hw: p 324, # 18-46 even

$$\begin{array}{r|rrrr} 2 & 1 & -5 & 2 & 8 \\ & & 2 & -6 & -8 \\ \hline & 1 & -3 & -4 & 0 \end{array}$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x=4 \quad | \quad x=-1$$