

# Long Division Notes

## warm up

divide:  $1. 2048 \div 8$

2. ~~5021~~  $5,525 \div 17$

3.  $599 \div 6$

## finding a factor

• something is a factor if it divides evenly with no remainder

**ex 1**

divide  $(x^2 - 9x - 10)$  by  $(x + 1)$

$$\begin{array}{r} x+1 \overline{) x^2 - 9x - 10} \\ - x^2 + x \phantom{- 10} \\ \hline -10x - 10 \\ - -10x - 10 \\ \hline \phantom{-} 0 \end{array}$$

• what times  $x$  is  $x^2 \rightarrow$  ans.  $x$ , put that up top  
multiply  $x+1$  by  $x$

• what times  $x$  is  $-10x \rightarrow$  answer is  $-10$

$\emptyset \leftarrow$  factor b/c no remainder

$$(x^2 - 9x - 10) \div (x + 1) = x - 10$$

**ex 2**  $(x^2 + 9x + 14) \div (x + 7)$

**ex 3**  $(3x^3 - 5x^2 + 10x - 3) \div (3x + 1) = x^2 - 2x + 4 - \frac{7}{3x+1}$

$$\begin{array}{r} x^2 - 2x + 4 \\ 3x+1 \overline{) 3x^3 - 5x^2 + 10x - 3} \\ - 3x^3 + x^2 \phantom{+ 10x - 3} \\ \hline -4x^2 + 10x \phantom{- 3} \\ - -6x^2 - 2x \phantom{- 3} \\ \hline 12x - 3 \\ - 12x + 4 \\ \hline -7 \end{array}$$

**ex 4**  $\frac{x^4 + 2x^3 + 10x - 9}{x^3 + 3}$