

## SUBTRACTING BY COLUMNS (Traditional)

**FACT 1:** Arrange the digits in columns by their place values. Subtract the columns from right to left using regrouping.

Subtract 387 from 623:

$$\begin{array}{r}
 \phantom{6} 1 \phantom{2} 13 \\
 6 \phantom{2} \phantom{3} \\
 - 387 \\
 \hline
 \phantom{6} 6 \\
 \hline
 \hline
 \end{array}
 \quad \rightarrow \quad
 \begin{array}{r}
 5 \phantom{2} 11 \phantom{3} \text{ regroup} \\
 \phantom{6} \phantom{2} \phantom{3} \\
 - 387 \\
 \hline
 236 \\
 \hline
 \hline
 \end{array}$$

- (a) For 1's: 7 is more than 3; regroup 1 from 10's column to have 13 ones; 13 minus 7 equal 6, put down 6.
- (b) For 10's: 1 is left in 10's column; regroup 1 from 100's column to have 11 tens; 11 minus 8 equal 3, put down 3.
- (c) For 100's: 5 is left in 100's column; 5 minus 3 equal 2; put down 2.
- (d) The difference is 236.

**FACT 2:** Verify the difference by reverse addition.

Subtract 369 from 657.

$$\begin{array}{r}
 657 \\
 - 369 \\
 \hline
 288 \\
 \hline
 \hline
 \end{array}
 \quad \text{Verify } \rightarrow \quad
 \begin{array}{r}
 288 \\
 + 369 \\
 \hline
 657 \\
 \hline
 \hline
 \end{array}$$

**FACT 3:** If there is 0 in a column we may have to regroup from farther left.

$$\begin{array}{r}
 \phantom{1} 9 \phantom{0} 9 \\
 1 \phantom{4} \phantom{0} \phantom{0} 15 \\
 - 2 \phantom{0} \phantom{0} \phantom{0} 5 \\
 \hline
 \phantom{1} 5 \phantom{0} 9 \\
 \hline
 \hline
 1496 \\
 \hline
 \hline
 \end{array}$$

- (a) For 1's: 9 is more than 5; regroup 1 from 10's column. Since there are zeroes in 10's and 100's columns, Regroup starting from 1000's columns as shown above. 15 minus 9 equal 6; put down 6.
- (b) For 10's: 9 is left in 10's column; 9 minus 0 equal 9, put down 9.
- (c) For 100's: 9 is left in 100's column; 9 minus 5 equal 4; put down 4.
- (d) For 1000's: 1 is left in 1000's column; put down 1.
- (e) The difference is 1496.

**FACT 4: We may subtract large numbers the same way.**

(a) Subtract:  $4,001,030,352 - 1,946,327,115$ .

$$\begin{array}{r}
 \phantom{4,} \overset{9}{0} \overset{9}{0} \overset{10}{1} \\
 3 \cancel{10} \cancel{10} \cancel{0} \overset{10}{0} \overset{2}{0} \overset{4}{0} \overset{12}{2} \\
 4, \cancel{0} \cancel{0} \cancel{1}, \cancel{0} \cancel{3} \cancel{0}, \cancel{3} \cancel{5} \cancel{2} \\
 1, 9 4 6, 3 2 7, 1 1 5 \\
 \hline
 2, 0 5 4, 7 0 3, 2 3 7
 \end{array}$$

Note that when there are several zeroes following each other in the larger number, regrouping takes place far from the left.

(b) Subtract:  $5,082,359,777 - 3,193,461,857$ .

$$\begin{array}{r}
 \phantom{5,} \overset{9}{0} \overset{17}{8} \overset{11}{2} \overset{12}{2} \\
 4 \cancel{10} \cancel{1} \cancel{1} \overset{2}{2} \overset{15}{5} \overset{8}{7} \overset{17}{7} \\
 5, \cancel{0} \cancel{8} \cancel{2}, \cancel{3} \cancel{5} \cancel{9}, \cancel{7} \cancel{7} \cancel{7} \\
 3, 1 9 3, 4 6 1, 8 5 7 \\
 \hline
 1, 8 8 8, 8 9 7, 9 2 0
 \end{array}$$

1. Subtract the following by columns. (Check your answers using a calculator)

(a)	(b)	(c)	(d)	(e)	(f)
$\begin{array}{r} 9 \ 3 \\ - 8 \ 9 \\ \hline \end{array}$	$\begin{array}{r} 7 \ 5 \\ - 6 \ 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \ 4 \\ - 5 \ 9 \\ \hline \end{array}$	$\begin{array}{r} 8 \ 7 \\ - 4 \ 7 \\ \hline \end{array}$	$\begin{array}{r} 8 \ 6 \\ - 4 \ 8 \\ \hline \end{array}$	$\begin{array}{r} 3 \ 6 \\ - 2 \ 3 \\ \hline \end{array}$
(g)	(h)	(i)		(j)	
$\begin{array}{r} 2 \ 6 \ 4 \\ - \ 5 \ 9 \\ \hline \end{array}$	$\begin{array}{r} 2 \ 9 \ 6 \\ - 1 \ 9 \ 8 \\ \hline \end{array}$	$\begin{array}{r} 1 \ 0 \ 0 \ 0 \\ - \ 8 \ 7 \ 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \ 0 \ 3 \ 1 \\ - 5 \ 6 \ 7 \ 3 \\ \hline \end{array}$		

**End of Lesson**