

Addition

Empty Number Line

$32 + 14$

A horizontal number line with a starting point at 32. A blue arc labeled '+10' goes from 32 to 42. A second blue arc labeled '+4' goes from 42 to 46.

Bridging 10

$46 + 37$

A horizontal number line with a starting point at 46. A red arc labeled '+30' goes from 46 to 76. A second red arc labeled '+4' goes from 76 to 80. A third red arc labeled '+3' goes from 80 to 83.

Partitioning - pulling the number into bits
 $46 + 32$

$30 + 2$

$46 + 30 = 76$

$76 + 2 = 78$

Expanded vertical method

$$\begin{array}{r} 235 \\ + 752 \\ \hline 7 \\ 80 \\ 900 \\ \hline 987 \end{array}$$

Compact vertical method
 Column method

$$\begin{array}{r} 235 \\ + 752 \\ \hline 987 \end{array}$$

Subtraction

Empty Number Line counting back

$34 - 12$

A horizontal number line with a starting point at 34. A blue arc labeled '-10' goes from 34 to 24. A second blue arc labeled '-2' goes from 24 to 22.

Bridging ten

$63 - 16$

A horizontal number line with a starting point at 63. A red arc labeled '-10' goes from 63 to 53. A second red arc labeled '-3' goes from 53 to 50. A third red arc labeled '-3' goes from 50 to 47.

Empty Number Line counting forward:
finding the difference

46 - 41

103 - 91

Partitioning

147 - 34

$$147 - 30 - 4$$

$$= 117 - 4$$

$$= 113$$

253 - 45

$$253 - 40 - 5$$

$$= 213 - 5$$

$$= 208$$

Expanded column method	Compact column method
<p>343 - 127</p> $\begin{array}{r} 300 + 40 + 3 \\ - 100 + 20 + 7 \\ \hline 200 + 10 + 6 = 216 \end{array}$	$\begin{array}{r} 343 \\ - 127 \\ \hline 216 \end{array}$

Multiplication

Empty number line

9 x 3

9 x 3

Partitioning	Grid method
<p>143 x 6</p> $100 \times 6 = 600$ $40 \times 6 = 240$ $3 \times 6 = 18$ $\hline 858$	$\begin{array}{r l} \times & 6 \\ \hline 100 & 600 \\ 40 & 240 \\ 3 & 18 \\ \hline & 858 \end{array}$

Expanded column method	Compact column method
$\begin{array}{r} 143 \\ \times 6 \\ \hline 18 \\ 240 \\ 600 \\ \hline 858 \end{array}$	$\begin{array}{r} 143 \\ \times 6 \\ \hline 858 \\ \hline 21 \end{array}$

Partitioning	Grid method	Expanded column method									
43×67 $40 \times 60 = 2400$ $40 \times 7 = 280$ $3 \times 60 = 180$ $3 \times 7 = 21$ $\underline{\underline{2881}}$	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">x</td> <td style="padding: 2px;">40</td> <td style="padding: 2px;">3</td> </tr> <tr> <td style="padding: 2px;">60</td> <td style="padding: 2px;">2400</td> <td style="padding: 2px;">180</td> </tr> <tr> <td style="padding: 2px;">7</td> <td style="padding: 2px;">280</td> <td style="padding: 2px;">21</td> </tr> </table> $2680 + 201$ 2881	x	40	3	60	2400	180	7	280	21	$\begin{array}{r} 43 \\ \times 67 \\ \hline 21 \\ 280 \\ 180 \\ 2400 \\ \hline 2881 \end{array}$
x	40	3									
60	2400	180									
7	280	21									

Compact method

$$\begin{array}{r} 236 \\ \times 47 \\ \hline 1632 \quad \times 7 \\ 9440 \quad \times 40 \\ \hline 11092 \end{array}$$

Division

Empty number line - repeated subtraction

$45 \div 5$

$= 9$

Chunking

$\begin{array}{r} 345 \div 3 = 115 \\ - 300 \\ \hline 45 \\ - 30 \\ \hline 15 \\ - 15 \\ \hline 0 \end{array}$	$\begin{array}{r} 345 \div 23 = 15 \\ - 230 \\ \hline 115 \\ - 115 \\ \hline 0 \end{array}$
(100×3) (10×3) (5×3)	(10×23) (5×23)

$$\begin{array}{r}
 500 \div 67 = 7 \text{ r}31 \\
 \underline{-335} \quad (5 \times 67) \\
 165 \\
 \underline{-134} \quad (2 \times 67) \\
 31
 \end{array}$$

'Bus Shelter' - short division

$$\begin{array}{r}
 1914 \\
 3 \overline{)5742}
 \end{array}$$