

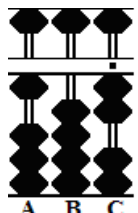
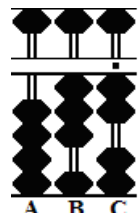
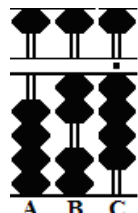


## SUBTRACTION EXAMPLES

## ABACUS: MYSTERY OF THE BEAD The Bead Unbaffled - An Abacus Manual

*\*\*All of the following examples will require using complementary numbers. In order to fully understand the technique, it's best to work these examples using your abacus.\*\**

**Example: 102 - 78 = 24**

	<b>Step 1</b>		<b>Step 2</b>		<b>Step 3</b>
	$\begin{array}{r} \text{A B C} \\ \hline 1 \ 0 \ 2 \end{array}$		$\begin{array}{r} \text{A B C} \\ \hline 1 \ 0 \ 2 \\ -1 \phantom{0} \phantom{2} \\ \hline 0 \ 0 \ 2 \\ +3 \\ \hline 0 \ 3 \ 2 \end{array}$		$\begin{array}{r} \text{A B C} \\ \hline 0 \ 3 \ 2 \\ -1 \phantom{0} \phantom{2} \\ \hline 0 \ 2 \ 2 \\ +2 \\ \hline 0 \ 2 \ 4 \end{array}$
			Step 2		Step 3
			Step 2a		Step 3a

**Step 1:** Set 102 on rods ABC.

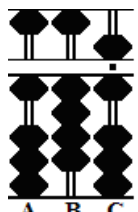
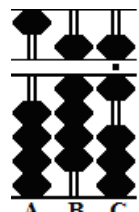
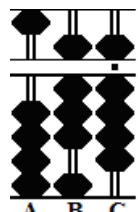
**Step 2:** Subtract 7 from tens rod B. Use the complement. Begin by subtracting 1 from hundreds rod A, then....

**Step 2a:** Add the complementary 3 to rod B leaving 32 on rods BC.

**Step 3:** Subtract 8 from units rod C. Use the complement again. Begin by subtracting 1 from hundreds rod A, then....

**Step 3a and the answer:** Add the complementary 2 to rod C leaving the answer 24 on rods BC.

**Example: 146 - 57 = 89**

	<b>Step 1</b>		<b>Step 2</b>		<b>Step 3</b>
	$\begin{array}{r} \text{A B C} \\ \hline 1 \ 4 \ 6 \end{array}$		$\begin{array}{r} \text{A B C} \\ \hline 1 \ 4 \ 6 \\ -1 \phantom{0} \phantom{6} \\ \hline 0 \ 4 \ 6 \\ +5 \\ \hline 0 \ 9 \ 6 \end{array}$		$\begin{array}{r} \text{A B C} \\ \hline 0 \ 9 \ 6 \\ -1 \phantom{0} \phantom{6} \\ \hline 0 \ 8 \ 6 \\ +3 \\ \hline 0 \ 8 \ 9 \end{array}$
			Step 2		Step 3
			Step 2a		Step 3a

**Step 1:** Set 146 on rods ABC.

**Step 2:** Subtract 5 from tens rod B. Use the complement. Begin by subtracting 1 from hundreds rod A, then....

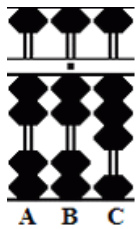
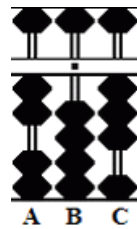

**Step 2a:** Add the complementary 5 to rod B, leaving 96 on rods ABC.

**Step 3:** Subtract 7 from units rod C. Use the complement again. Begin by subtracting 1 from hundreds rod A, then....

**Step 3a and the answer:** Add the complement 3 to rod C leaving the answer 89 on rods ABC.

*Note the decimal numbers in the following example. Rod B is the designated unit rod.*

**Example: 22.3 - 2.8 = 19.5**

 <p style="text-align: center;"><b>Step 1</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">A</td><td style="border-right: 1px solid black; padding: 0 5px;">B</td><td style="padding: 0 5px;">C</td></tr> <tr><td colspan="3" style="text-align: center;">.</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="padding: 0 5px;">3</td></tr> </table>	A	B	C	.			2	2	3	 <p style="text-align: center;"><b>Step 2</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">A</td><td style="border-right: 1px solid black; padding: 0 5px;">B</td><td style="padding: 0 5px;">C</td></tr> <tr><td colspan="3" style="text-align: center;">.</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="padding: 0 5px;">3</td></tr> <tr><td colspan="3" style="text-align: center;">-2</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="border-right: 1px solid black; padding: 0 5px;">0</td><td style="padding: 0 5px;">3</td></tr> </table> <p style="text-align: right; margin-right: 20px;"><b>Step 2</b></p>	A	B	C	.			2	2	3	-2			2	0	3	 <p style="text-align: center;"><b>Step 3</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 0 5px;">A</td><td style="border-right: 1px solid black; padding: 0 5px;">B</td><td style="padding: 0 5px;">C</td></tr> <tr><td colspan="3" style="text-align: center;">.</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">2</td><td style="border-right: 1px solid black; padding: 0 5px;">0</td><td style="padding: 0 5px;">3</td></tr> <tr><td colspan="3" style="text-align: center;">-1</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="border-right: 1px solid black; padding: 0 5px;">0</td><td style="padding: 0 5px;">3</td></tr> <tr><td colspan="3" style="text-align: center;">+9</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="border-right: 1px solid black; padding: 0 5px;">9</td><td style="padding: 0 5px;">3</td></tr> <tr><td colspan="3" style="text-align: center;">+2</td></tr> <tr><td style="border-right: 1px solid black; padding: 0 5px;">1</td><td style="border-right: 1px solid black; padding: 0 5px;">9</td><td style="padding: 0 5px;">5</td></tr> </table> <p style="text-align: right; margin-right: 20px;"><b>Step 3</b></p> <p style="text-align: right; margin-right: 20px;"><b>Step 3a</b></p> <p style="text-align: right; margin-right: 20px;"><b>Step 3b</b></p>	A	B	C	.			2	0	3	-1			1	0	3	+9			1	9	3	+2			1	9	5
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**Step 1:** Designate rod B as the unit rod. Set 22.3 on rods ABC.

**Step 2:** Subtract 2 from units rod B leaving 20.3 on rods ABC.

**Step 3:** Subtract 8 from tenths rod C. Use the complement. Begin by subtracting 1 from units rod on B...*There's a problem. Rod B is empty. There's nothing there to subtract so we have to go all the way over to rod A for help.*

**Step 3a:** Subtract 1 from tens rod A. Add 9 to rod B, \*then\*

**Step 3b and the answer:** Add the complementary 2 to rod C leaving 19.5 on rods ABC.

*\*\*Something like this last example may seem a stretch at first. \*\*  
But with a little practice, solving problems of this sort soon becomes second nature.*