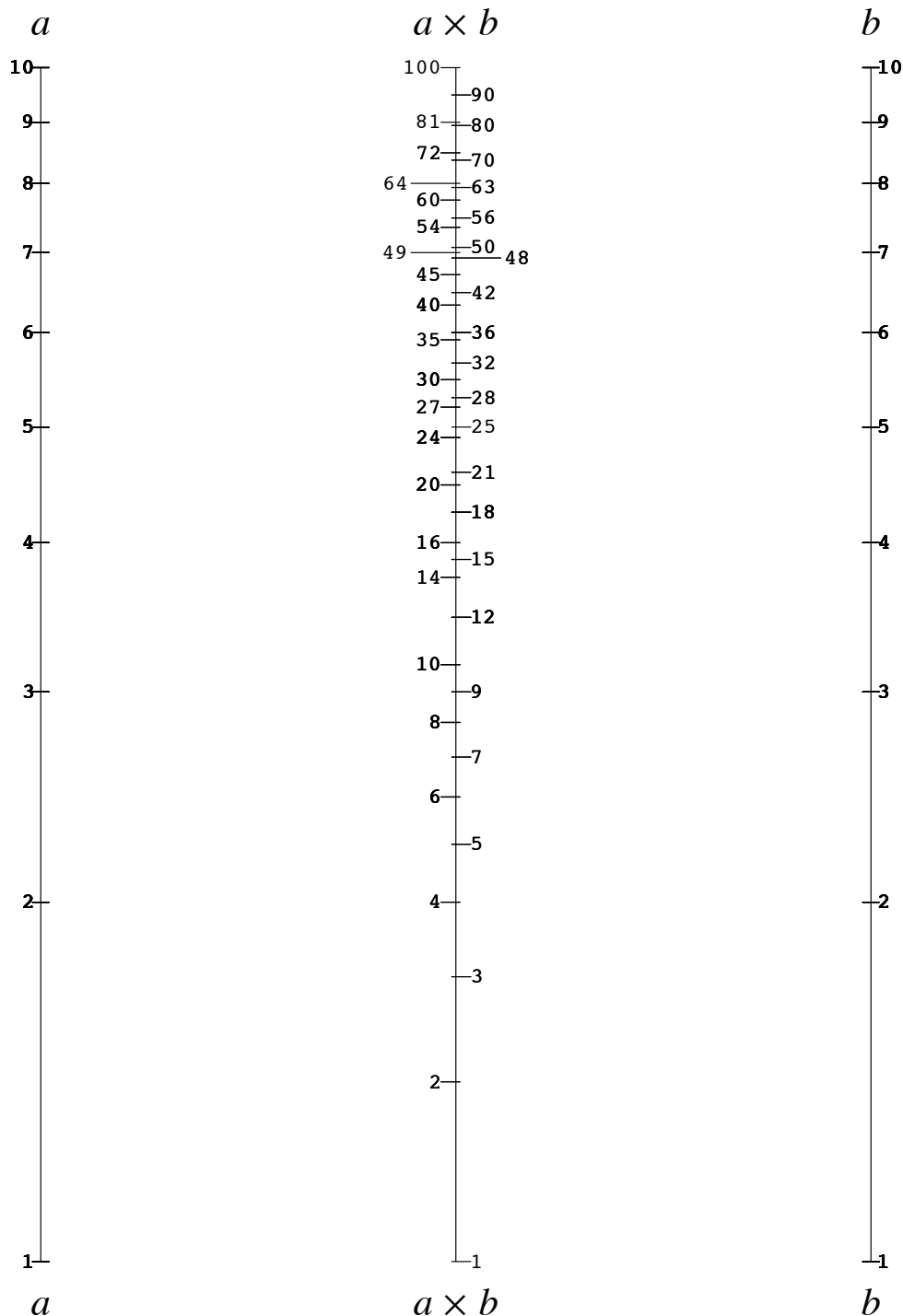


# Paper and string calculator



Stretch a piece of string from 3 on the left hand line to 4 on the right hand line, and it will go through 12 on the middle line: so,  $3 \times 4 = 12$ .

To multiply any numbers 1 to 10: stretch a piece of string from a number on the left hand column ( $a$ ) to a number on the right hand column ( $b$ ). The string will cross the middle line at the number  $ab$ .

To divide a number, find it on the middle column, and use a straight edge (a transparent ruler is best) to find its divisor on the right column. The answer will be where the straight edge crosses the left hand column. For example, to divide 12 by 4, align a straight edge through 12 in the middle column, 4 in the right column, and it will go through the answer 3 in the left column.

Further reading: Thomas L. Hankin (1999) "Blood, Dirt, and Nomograms: A Particular History of Graphs," *Isis*, volume 90, pages 50-80. Downloadable from <http://www.journals.uchicago.edu/Isis/>

