

1134-97-449

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Systematic Method for 'FOIL' Reduction By Powers of Ten.

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Abstract. To promote individuals in using mental math, I examined the use of "Foil" method to develop a systematic solution to solve circumstantial arithmetic in an effortless way. In particular, patterns in which the last two digits end in a sum of ten, allowing one to complete the solution by using powers of ten and avoiding the use of tools.

Assume $0 < a, b, c, d < 10$ Assume $b + d = 10$ and $a > c$ and $b > d$ $(10a+b) * (10c+d) = 100ac+10[(a-c)d+10c] + bd$ Proof. $(10a + b)(10c+d) = 100ac + (10ad + 10cb) + bd$. $(10ad + 10cb) = 10(a-c)d + 10cd + 10 cb = 10(a-c)d + 10c(b+d) = 10(a-c)d + (10c) * 10 = 10[(a-c)d + 10c]$ (Received September 12, 2017)