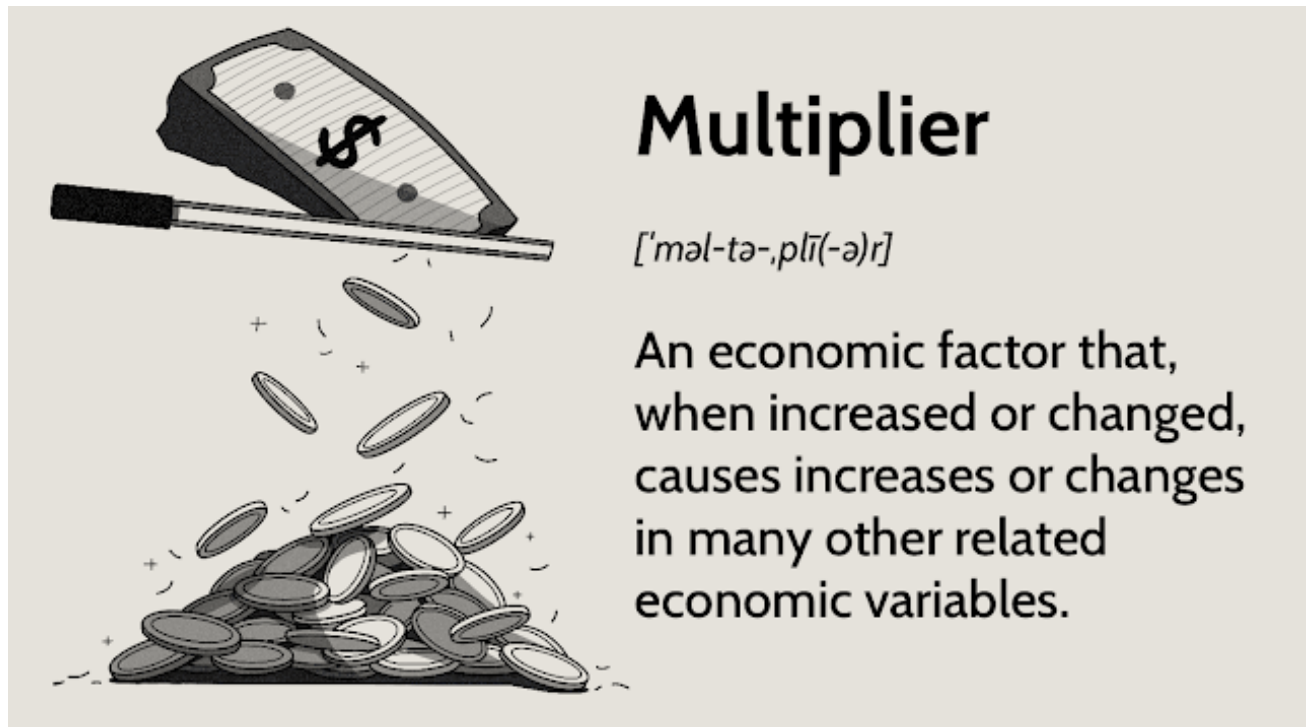


Cinquante signes

Smallest multiplication



décembre 07, 2022



Hello Math-Fun

We're looking today for the "smallest" multiplication (using new distinct terms) that produces one after the other all the nonnegative integers.

0 is present in $0 \times 1 = 0$

1 is present in $2 \times 5 = 10$ (as we cannot use again the integers 0 and 1)

2 is present in $3 \times 4 = 12$ (as we cannot use again the integers 0, 1, 2 and 5)

3 is present in $6 \times 22 = 132$ (as we cannot use again the integers 0, 1, 2, 3, 4 and 5)

4 is present in $7 \times 12 = 84$ (as we cannot ...)

5 is present in $8 \times 19 = 152$

6 is present in $9 \times 14 = 126$

7 is present in $10 \times 17 = 170$

8 is present in $11 \times 18 = 198$

9 is present in $13 \times 15 = 195$

10 is present in $16 \times 63 = 1008$

11 is present in $19 \times 58 = 1102$

...

Integers used so far that cannot be reused (if I'm not wrong):

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 58, 63

We could submit S to the OEIS, with the hereunder (heavy) definition:

Definition

— The sequence S must be seen as a succession of pairs of integers:

$[a(1), a(2)], [a(3), a(4)], [a(5), a(6)], [a(7), a(8)], \dots$

— All $a(n)$ s are distinct nonnegative integers.

— The integer resulting in $a(1) * a(2)$ has "0" as substring; the product $a(3) * a(4)$ has "1" as substring; the product $a(5) * a(6)$ has "2" as substring; etc.

We have so far for S:

$S = 0, 1, 2, 5, 3, 4, 6, 22, 7, 12, 8, 19, 9, 14, 10, 17, 11, 18, 13, 15, 16, 63, 19, 58, \dots$

Best,

É.

Update

Maximilian H. (the best typo/bug-hunter in town!) was quick to correct and extend **S**:

> Hello Eric,

I confirm your terms upto (16, 63), but then I get (20, 55),

the 19 is used earlier in $8 * 19$:

$S = (0, 1), (2, 5), (3, 4), (6, 22), (7, 12), (8, 19), (9, 14), (10, 17), (11, 18), (13, 15), (16, 63), (20, 55), (21, 58), (23, 31), (24, 59), (25, 46), (26, 62), (27, 64), (28, 65), (29, 66), (30, 34), (32, 38), (33, 37), (35, 67), (36, 68), (39, 75), (40, 315), (41, 47), (42, 69), (43, 103), (44, 70), (45,$


71), (48, 84), (49, 117), (50, 268), (51, 85), (52, 93), ...

> For the **definition** one could use :

Lexicographic earliest sequence of nonnegative integers without duplicates such that $S(2k) * S(2k+1)$ has k as substring, for all $k = 0, 1, 2, \dots$

-M.

Great (as always!) -- merci Maximilian!



Equity Multiplier

[ˈe-kwə-tē ˈmæl-tə-,plī(-ə)r]

A measure of the portion of a company's assets that is financed by stock rather than debt.



MFH 7 décembre 2022 à 17:58



I get: $S = (0, 1), (2, 5), (3, 4), (6, 22), (7, 12), (8, 19), (9, 14), (10, 17), (11, 18), (13, 15), (16, 63), (20, 55), (21, 58), (23, 31), (24, 59), (25, 46), (26, 62), (27, 64), (28, 65), (29, 66), (30, 34), (32, 38), (33, 37), (35, 67), (36, 68), (39, 75), (40, 315), (41, 47), (42, 69), (43, 103), (44, 70), (45, 71), (48, 84), (49, 117), (50, 268), (51, 85), (52, 93), \dots$

Alternate definition: Lexicographic earliest sequence of distinct nonnegative integers such that $S(2k) * S(2k+1)$ has k as substring, for all $k \geq 0$.

RÉPONDRE

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Posts les plus consultés de ce blog

A square for three (chess)

juin 22, 2024



(English translation after the French text) Voici cinq problèmes d'échecs disjoints : a) combien faut-il de coups au minimum pour que trois pions soient capturés sur la même case ? b) trois tours c) trois c ...

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Le tripalin se présente

avril 11, 2024



Un tripalin est constitué de trois images. Chaque image illustre un substantif. Accolés, ces trois substantifs forment une chaîne palindromique. Laquelle nous vous invitons à trouver. Exer ...

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Some strings au cinéma Galeries

juillet 19, 2024

Lettre ouverte au cinéma Galeries Bonsoir à tous, Je viens de voir pour la seconde fois chez vous le beau film de Léos Carax (la première fois c'était le 26 juin en présence du réalisateur, au BRIFF). Apparus à l'écran aujourd'hui, avant la projection propre ...

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