

Substitution Arithmetic

CKSTEM Math Problem Solving · Grades 5–8

Try each problem on your own first — then watch the solution videos.

L0 Repeated Addition

A new button ★ is defined by two examples: $3 \star 2 = 3 + 3$ and $4 \star 3 = 4 + 4 + 4$. Using the same pattern, what is $5 \star 4$?

WORK IT OUT HERE

L1 Arithmetic Trail

A two-symbol code $a \star b \star c$ is shown by two examples: $1 \star 2 \star 3 = 1 + 3 + 5$ and $4 \star 3 \star 4 = 4 + 7 + 10 + 13$. Using the same pattern, what is $5 \star 2 \star 6$?

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L2 Inside Out

A diamond rule says $a \diamond b = 3a - 2b$. Using this rule, what is $5 \diamond (4 \diamond 1)$?

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L3 Substitute and Solve

A blend rule says $a \diamond b = (a + b) \div (1 + ab)$. If $2 \diamond x = 4/7$, find x .

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L4 Decode the Rule

A box rule satisfies $1 \star 2 = 7$, $2 \star 1 = 8$, and $1 \star 3 = 10$. Assuming $a \star b = ma + nb + c$, find the value of x for which $x \star 5 = 20$.

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L5 Decode and Chain

A rule satisfies $1 \star 1 = 4$, $1 \star 2 = 7$, and $2 \star 1 = 6$. Assuming $a \star b = ab + ma + nb$, compute $3 \star (2 \star 1)$.

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