

§ 3.3 example

ex Find $4_{\text{five}} \times 23_{\text{five}}$ in two different ways.

Method 1: Lets translate everything into our Hindu-Arabic system.

Recall in base five: longs are made of 5 units

4_{five} equals 4 units so 4

23_{five} equals 2 longs and 3 units. so $2 \cdot 5 + 3 = 13$

In our usual system we want to find 4×13 .

Lets use the distribution over addition, or equivalently lets

break this problem up since $13 = 10 + 3$.

So 4×13 is the same as $4 \cdot 10 + 4 \cdot 3$.

Four tens is 40 and four threes is 12 so we

have $40 + 12$ or 52 .

Method 2: Lets try to stay in base five and use the repeated addition model.

Note 4_{five} is the same as 4, so we want to

add 23_{five} to itself four times.

In the method above we unpacked 23_{five} as 2 longs + 3 units

so we will draw 4 copies:



Now we regroup. Recall 5 longs make a flat, (and 5 units make a long).

Initially we have 1 flat, 5 longs, + 2 units



We can gather the second set of 5 longs

To have 2 flats and 2 units or 202_{five}