

## Why Are These All $24 \div 3$ ?

Explain why all of the problems below may be thought of as  $24 \div 3$ :

- a.  $2400 \div 300$
- b.  $240 \div 30$
- c.  $120 \div 15$
- d.  $48 \div 6$

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### ***Discussion, Suggestions, Possible Solutions***

*One of the “rules” of division is when the divisor and the dividend end with 0’s, we can simply eliminate the same number of 0’s from both to simplify the problem. Unfortunately, students often learn this rule without understanding why it works or a much more general, thus more powerful, rule of division.*

*This rule is probably more easily understood if we consider measurement division, that is how many groups of the size specified by the divisor can be made with the dividend. So, for example, problem (a) asks how many groups of 300 we can make with 2400. When we look at these numbers using 100 as a unit, the question is how many groups of 3 hundred’s can we make with 24 hundreds. If we can imagine base-10 blocks, the question is asking how many groups of 3 flats can we make with 24 flats. Obviously this problem is equivalent to  $24 \div 3$ . In the same manner, if you look at the numbers in (b) using ten as a unit, the problem is equivalent to  $24 \div 3$  (how many groups of 3 tens can we make with 24 tens?).*

*For (c) and (d), we do the same except the units we use are not a power of 10. For (c), we use the unit of 5 (how many groups of 3 five’s can we make with 24 five’s?), and for (d), we use the unit of two (how many groups of 3 two’s can we make with 24 two’s?).*

*In each situation, we can obtain the given division problems by multiplying both the dividend and the divisor of  $24 \div 3$  by the units we use, or we can divide the dividends and the divisors of the given problems by the unit to obtain  $24 \div 3$ . In general, a useful rule of division is when you multiply (or divide) both the dividend and the divisor by the same number, the quotient remains the same. This rule is the foundation for M5N3 a & b (division of decimal numbers), M5N4 b (creating equivalent fractions by multiplying or dividing the numerator and the denominator by the same number), and M6N1 e (division of fractions).*

