

# Puzzle of the Week

## *Combining Digits – Easy as 1 2 3 4*

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Here are some ways to get 0 and 1 using 1, 2, 3, and 4.

$$0 = 1 + 4 - 2 - 3$$

$$0 = (3 - 1 - 2) * 4$$

$$1 = (2 - 1) * (4 - 3)$$

$$1 = 4 - 3 * (2 - 1)$$

**THE CHALLENGE:** How many numbers can you get using each of the numbers 1, 2, 3, and 4 in any order, using addition, subtraction, and multiplication?

**EXPLORATION:** How many more numbers can you make if you are also allowed to make two-digit numbers with the digits? For example,  $26 = 24 + 3 - 1$ .

# Puzzle of the Week

## *Combining Digits – 1 2 3 4 – Notes*

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**THE CHALLENGE:** Here are some solutions, with one missing, from 0 to 21. Of course, there are many more. Have fun comparing different people's solutions!

$$0 = 1 + 4 - 2 - 3$$

$$1 = 4 - 3 * (2 - 1)$$

$$2 = (2 - 1) + (4 - 3)$$

$$3 = 4 - (3 - 2 * 1)$$

$$4 = 4 * (3 - 2 * 1)$$

$$5 = 4 + (3 - 2 * 1)$$

$$6 = 4 + 3 - 2 + 1$$

$$7 = 4 + 3 * (2 - 1)$$

$$8 = 4 * (3 - (2 - 1))$$

$$9 = 3 * (4 - (2 - 1))$$

$$10 = 1 + 2 + 3 + 4$$

$$11 = 3 * 4 - (2 - 1)$$

$$12 = 3 * 4 * (2 - 1)$$

$$13 = 3 * 4 + (2 - 1)$$

$$14 = 2 * (3 + 4) * 1$$

$$15 = 2 * (3 + 4) + 1$$

$$16 = 2 * (1 + 3 + 4)$$

$$17 =$$

$$18 = 4 * (3 + 1) + 2$$

$$19 = 4 * (2 + 3) - 1$$

$$20 = 4 * (2 + 3) * 1$$

$$21 = 4 * (2 + 3) + 1$$

**EXPLORATION:** Here are solutions up to 37 making use of two-digit numbers.

$$18 = 23 - 4 - 1$$

$$19 = 23 - 4 * 1$$

$$20 = 24 - 3 - 1$$

$$21 = 24 - 3 * 1$$

$$22 = 2 * 13 - 4$$

$$23 = 4 * 3 * 2 - 1$$

$$24 = 4 * 3 * 2 * 1$$

$$25 = 2 * 14 - 3$$

$$26 = 24 + 3 - 1.$$

$$27 = 23 + 1 * 4$$

$$28 = 23 + 4 + 1$$

$$29 = 32 - 4 + 1$$

$$30 = (4 + 1) * 3 * 2$$

$$31 = 34 - 2 - 1$$

$$32 = 34 - 2 * 1$$

$$33 = 34 - 2 + 1$$

$$34 = 34 * (2 - 1)$$

$$35 = 34 + 2 - 1$$

$$36 = 34 + 2 * 1$$

$$37 = 34 + 2 + 1$$