

Adding Two Odd Primes : Solutions

puzzle #1

1. Is the sum of an even number and even number odd or even?

2. Is the sum of an odd number and an even number and an even number and an odd number and an odd number even or odd?

3. Suzzy says that ten pages have been torn out of her textbook. (This is not good!) Arjun says: "The sum of the missing page numbers is odd." How does he know this?

ANSWER TO PUZZLE 1:

1. EVEN + EVEN = EVEN
2. ODD + EVEN + EVEN + EVEN + ODD + ODD + ODD = EVEN
3. Each sheet of paper torn out has an odd-numbered page number on one side and an even-numbered page number on the other.

So, the sum of missing page numbers is a sum of ten odd numbers and ten even numbers. The result is sure to be EVEN.

puzzle #2

The numbers that come from rectangle arrangements, with one side of the rectangle one unit longer than the other, are called the "oblong numbers."

Take the number 41, which is prime. If you add the oblong numbers to it, do you keep getting prime number answers?

$$41 + 2 = 43 \quad \text{prime}$$

$$41 + 6 = 47 \quad \text{prime}$$

$$41 + 12 = 53 \quad \text{prime}$$

$$41 + 20 = 61 \quad \text{prime}$$

etc.

ANSWER TO PUZZLE 2:

Alas, this is not true. The first time we see a non-prime answer is with

$$41 + 40 \times 41 = 1681, \text{ which not prime.}$$

(We have $1681 = 41 \times 41$.)

It is amazing that this procedure gives a prime number thirty-nine times in a row!

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The NMF Weekly is written by mathematician Dr. James Tanton as a resource for friends and fans of the 2021 National Math Festival.



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