

“Factor Gate”

Several students were given the problem, “Factor $2x^2 + 12x + 16$ ”. There’s only one problem, all of the students got different answers! Which of the students do you think is correct and why?

Factor $2x^2 + 12x + 16$.

Student 1: [$a \times c$ method]

$$2x^2 + 12x + 16 = 2x^2 + 8x + 4x + 16 = 2x(x + 4) + 4(x + 4) = (2x + 4)(x + 4)$$

Student 2: [Guess and Check method]

$$(2x + 1)(x + 16) = 2x^2 + 33x + 16$$

$$(2x + 16)(x + 1) = 2x^2 + 18x + 16$$

$$(2x + 2)(x + 8) = 2x^2 + 18x + 16$$

$$(2x + 8)(x + 2) = 2x^2 + 12x + 4$$

Student 3: [Factor out GCF first]

$$2(x^2 + 6x + 8) = 2(x + 2)(x + 4)$$