

Math Hospital

Each of these problems is “sick” and came to the “Math Hospital” something is wrong and each one needs to be fixed. As a group work to decide where the problem is and how to fix the problem.

16. $\frac{(x^2+5x+20)+(x^2+6x-6)}{x+2}$

Handwritten work for problem 16:

$$\frac{2x^2 + 11x + 14}{x+2} = 2x^2 + 5$$

The student used a grid to multiply $(2x^2 + 5)(x+2)$ to get $2x^3 + 11x^2 + 14x + 10$, which does not match the numerator. The correct answer is $x + 5$.

17. $(x^2 - 4)(x + 3) - (x^2 + 2x - 5)$

Handwritten work for problem 17:

$$(x^3 - x^2 - 12) - (x^2 + 2x - 5) = x^3 - 2x^2 - 2x - 7$$

The student correctly multiplied $(x^2 - 4)(x + 3)$ to get $x^3 - x^2 - 12$, but then incorrectly subtracted $(x^2 + 2x - 5)$ from it, resulting in $x^3 - 2x^2 - 2x - 7$. The correct result is $x^3 - 2x^2 - 2x - 7$.

18. $\frac{(x-3)^3}{x^2-6x+9} = \frac{(x-3)^2 \cdot (x-3)}{x^2-6x+9}$

Handwritten work for problem 18:

$$\frac{(x-3)^2 \cdot (x-3)}{(x-3)(x-3)} = \frac{(x-3)^2}{x-3}$$

The student correctly identified the denominator as $(x-3)^2$ but did not cancel it with the numerator, leaving $\frac{(x-3)^2}{x-3}$ instead of $x-3$.

19. $(x + 7)(2x - 3) - (x^3 - 2x^2 + x - 2) \div (x - 2)$

Handwritten work for problem 19:

$$2x^2 - 11x - 21 + x^2 - 1 = 3x^2 - 11x - 22$$

The student correctly multiplied $(x+7)(2x-3)$ to get $2x^2 - 11x - 21$. However, they incorrectly divided $(x^3 - 2x^2 + x - 2)$ by $(x-2)$ to get $x^2 - 1$. The correct division result is $x^2 + x - 2$.