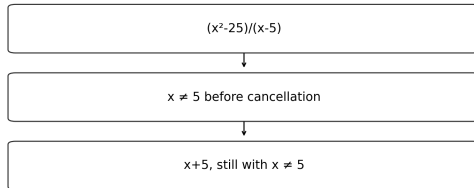


Equivalent expressions and domain restrictions

Original skill preparation; versioned source scope

Method and conditions



- Equivalent expressions must agree on the stated domain .
- Distributive law; difference of squares; real square roots.

Worked method 1

Read and reason

Equivalent expressions must agree on the stated domain .

$E(x) = (x^2 - 25)/(x - 5) = (x + 5)$ only for $x \neq 5$. Cancellation removes a factor, but it cannot restore an excluded input. Also $\sqrt{x^2} = |x|$, because the principal square root cannot be negative.

Original context 1

Read and reason

Task context

Read and reason

Each task below states its own complete data. Values may differ from the worked example.

Attempt 1.1

Read and reason

Simplify $F(x) = (x^2 - 4x)/(x^2 - 16)$. State every original restriction and explain why F is not identical to $x/(x + 4)$ on that latter formula's whole domain.

Reasoning 1.1

Read and reason

Factor numerator $x(x - 4)$ and denominator $(x - 4)(x + 4)$. The original domain excludes $x = 4, -4$. Cancellation gives $F(x) = x/(x + 4)$ for $x \neq 4, -4$. The latter formula alone permits 4, where it gives $1/2$, while $F(4)$ is undefined.

Attempt 2.1

Read and reason

Find the coefficient of x in $(3x - 2)(x + 5)$ and evaluate $\sqrt{(x - 5)^2}$ when $x = 1$.

Reasoning 2.1

Read and reason

Expansion gives $3x^2 + 15x - 2x - 10 = 3x^2 + 13x - 10$, so the coefficient is 13. The root is $|x - 5|$; at $x = 1$, it is $|-4| = 4$, not -4 or 16 .

Attempt 3.1

Read and reason

A student tests $x = 2$ and concludes that x^2 and $2x$ are equivalent. Refute the conclusion and solve where they actually agree.

Reasoning 3.1

Read and reason

At $x = 3$ the outputs are 9 and 6, so one matching test is not proof. Solve $x^2 = 2x$ as $x(x - 2) = 0$, giving only $x = 0, 2$.

Transfer and limits

Read and reason

Distributive law; difference of squares; real square roots.

Check yourself

Read and reason

Close the worked reasoning. Explain why the method fits the final transfer task, reconstruct its conclusion, and state a condition that would change your answer. Then check the full reasoning in the reference.