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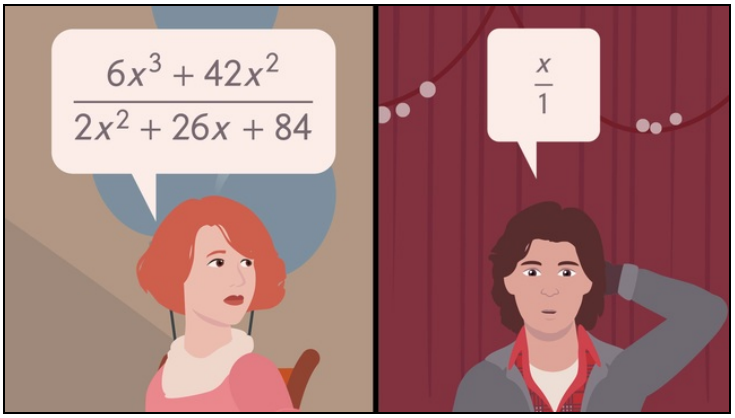
Simplifying Rational Expressions



1. **Describe what can be done to simplify rational expressions.**
2. Explain how to simplify the following expression.
3. Simplify the rational expression.
4. Decide the terms to be cancelled out.
5. Determine the simplified rational expression.
6. Examine if the given rational expressions can be simplified.

\+ with lots of tips, answer keys, and detailed answer explanations for all of the problems.

Describe what can be done to simplify rational expressions.

Choose the correct expressions.

$$\frac{x-5}{x^2-10x+25}$$

- [ ] **A** One can cancel out any summand.
- [ ] **B** One can only cancel out an entire polynomial factor.
- [ ] **C** For example, we can simplify as follows: $\frac{x-5}{x-5} = \frac{x-5}{x-5} = \frac{x}{x} = 1$
- [ ] **D** Any number divided by itself is zero.
- [ ] **E** Any number divided by itself is one.
- [ ] **F** The rational expression above can be simplified to $\frac{1}{x-5}$.

Hints for solving these problems

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Describe what can be done to simplify rational expressions.

Hint #1

For example, $\frac{3+5}{5} = \frac{8}{5}$.

Hint #2

Using FOIL multiplication, we have that $(x-5)(x-5) = x^2 - 5x - 5x + 25 = x^2 - 10x + 25$.

Hint #3

If you divide 2 by 2 you get 1.

Answers and detailed answer explanations for these problems

1 of 6

Describe what can be done to simplify rational expressions.

Answer key: B, E, F

Another way of simplifying expressions is to look for matching binomial pairs.

Let's have a look at the following expression: $\frac{x-5}{x^2-10x+25}$.

The numerator is already simplified. The denominator can be factored:
$x^2-10x+25=(x-5)(x-5)$.

One can't cancel out -5; you can only cancel out entire polynomial factors.

We can cancel out $x-5$ to get $\frac{x-5}{x^2-10x+25}=\frac{x-5}{(x-5)(x-5)}=\frac{1}{x-5}$.

Keep in mind that any number divided by itself is equal to 1.