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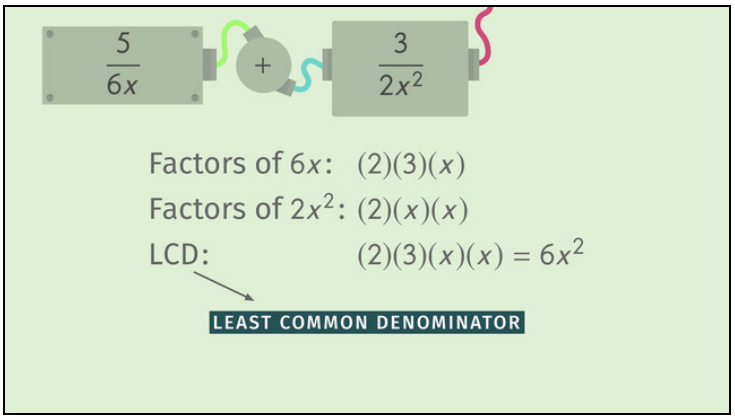
Adding, Subtracting, Multiplying, and Dividing Rational Expressions



1 **Explain the meaning of LCD.**

2 Explain how to add or subtract rational expressions.

3 Multiply and divide the following rational expressions.

4 Find the expressions that can be simplified.

5 Determine the following expression.

6 Calculate the given expressions.

\+ with many hints, answer keys, and solution approaches for all tasks

Explain the meaning of LCD.

Choose the correct statement(s).

To add or subtract two fractions we first have to find the **LCD**.

But, what does that mean?

- [ ] **A** The **LCD** is the longest common denominator.
- [ ] **B** The **LCD** is the least common denominator.
- [ ] **C** You can find the **LCD** by factoring the numerators of both fractions to be added or subtracted.
- [ ] **D** You have to find the **LCD** for multiplying two fractions as well.
- [ ] **E** The **LCD** of $\frac{5}{6x}$ and $\frac{3}{2x^2}$ is given by $(5)(3) = 15$
- [ ] **F** The **LCD** of $\frac{5}{6x}$ and $\frac{3}{2x^2}$ is given by $(2)(3)(x)(x) = 6x^2$

Our hints for the tasks

1 from 6

Explain the meaning of LCD.

1. Hint

$$\frac{5}{12}+\frac{3}{8}=\frac{5}{(2)(2)(3)}+\frac{3}{(2)(2)(2)}$$

To determine the **LCD** first factor, as you can see pictured.

The **LCD** is $(2)(2)(2)(3)=24$.

To check it, you can divide 24 by 8 as well as by 12.

2. Hint

You can only add or subtract fractions with common denominators.

3. Hint

To multiply two fractions, just multiply the numerators as well as the denominators.

4. Hint

The result of the addition above is given by

$$\begin{aligned}\frac{5}{12}+\frac{3}{8} &= \frac{(5)(2)}{(12)(2)}+\frac{(3)(3)}{(8)(3)}\\ &= \frac{10}{24}+\frac{9}{24}\\ &= \frac{19}{24}\end{aligned}$$

Solutions and solution approaches for the tasks

1 from 6

Explain the meaning of LCD.

Answer key: B, F

To add or subtract two fractions we first have to determine the **LCD**, or least common denominator. How can we determine it?

Let's have a look at the following example: $\frac{5}{6x} + \frac{3}{2x^2}$.

1. Factor both denominators $6x = (2)(3)(x)$ and $2x^2 = (2)(x)(x)$ The factors 2 as well as x appear in both denominators. So we take them only once.

2. The LCD is given by $(2)(3)(x)(x) = 6x^2$.

If we must multiply fractions, we don't need to determine the LCD. We still have to multiply the numerators as well as the denominators.