

Boost Free Lessons - Year 9 Maths

Lesson 7: Adding and Subtracting Algebraic Fractions

Name: _____ Grade: _____ Date: _____

Worked Example 1

Simplify $\frac{x}{3} + \frac{x}{4}$

1. The denominators are different, so find the lowest common denominator. For 3 and 4 it is 12.
2. Convert each fraction: $\frac{x}{3} = \frac{4x}{12}$ and $\frac{x}{4} = \frac{3x}{12}$.
3. Now add the numerators only: $4x + 3x = 7x$.
4. The denominator stays as 12.

$$= \frac{7x}{12}$$

Worked Example 2

Simplify $\frac{x+2}{3} - \frac{x-1}{5}$

1. The lowest common denominator of 3 and 5 is 15.
2. $\frac{x+2}{3} = \frac{5(x+2)}{15} = \frac{5x+10}{15}$.
3. $\frac{x-1}{5} = \frac{3(x-1)}{15} = \frac{3x-3}{15}$.
4. Subtracting the whole second numerator flips both of its signs: $5x + 10 - 3x + 3$.

$$= \frac{2x+13}{15}$$

Remember: Find the lowest common denominator first, then work with the numerators only. When you subtract a numerator with more than one term, change the sign of **every** term in it.



Question 1: Simplify the following.

1. $\frac{x}{2} + \frac{x}{3}$

2. $\frac{x}{5} + \frac{x}{4}$

3. $\frac{2x}{3} + \frac{x}{6}$

4. $\frac{3x}{4} - \frac{x}{2}$

5. $\frac{a}{3} - \frac{a}{5}$

6. $\frac{m}{2} + \frac{m}{2}$

7. $\frac{5y}{6} - \frac{y}{3}$

8. $\frac{3k}{4} + \frac{k}{8}$



Question 2: Simplify the following.

1. $\frac{x+1}{2} + \frac{x+3}{2}$

2. $\frac{x+4}{3} + \frac{x-1}{3}$

3. $\frac{x+2}{2} + \frac{x+1}{3}$

4. $\frac{x+5}{4} - \frac{x-3}{4}$

5. $\frac{2x-1}{3} - \frac{x+2}{6}$

6. $\frac{x-3}{5} + \frac{x+2}{2}$



Question 3: Answer the following questions.

1. Simplify $\frac{x}{2} + \frac{x}{3} + \frac{x}{6}$.

2. Simplify $\frac{3x}{5} - \frac{x}{10}$.

3. Simplify $\frac{x+6}{4} - \frac{x-2}{4}$.

4. A rectangle has length $\frac{x}{2}$ and width $\frac{x}{3}$. Write and simplify an expression for its perimeter.

5. Simplify $\frac{2x+3}{4} + \frac{x-1}{2}$.





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Answers: Adding and Subtracting Algebraic Fractions**Question 1**

1. $\frac{5x}{6}$

2. $\frac{9x}{20}$

3. $\frac{5x}{6}$

4. $\frac{x}{4}$

5. $\frac{2a}{15}$

6. m

7. $\frac{y}{2}$

8. $\frac{7k}{8}$

Question 2

1. $x + 2$

2. $\frac{2x + 3}{3}$

3. $\frac{5x + 8}{6}$

4. 2

5. $\frac{3x - 4}{6}$

6. $\frac{7x + 4}{10}$

Question 3

1. x

2. $\frac{x}{2}$

3. 2

4. $\frac{5x}{3}$

5. $\frac{4x + 1}{4}$

