

$\frac{7}{3} + \frac{35}{18} + \frac{54}{20}X$, Then $X =$ a. $\frac{8}{9}$ b. $\frac{81}{4}$ c. $\frac{4}{9}$ d. None Of Above

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Understanding how to evaluate algebraic expressions involving fractions and variables is an essential skill in mathematics. In this article, we will analyze the expression $\frac{7}{3} + \frac{35}{18} + \frac{54}{20}X$ and determine the value of X among the given options:

- a. $\frac{8}{9}$
- b. $\frac{81}{4}$
- c. $\frac{4}{9}$
- d. None Of Above

This comprehensive guide will walk you through the step-by-step process of solving the expression, simplifying fractions, and selecting the correct value for X .

Breaking Down the Expression

The expression in question is:

$$\frac{7}{3} + \frac{35}{18} + \left(\frac{54}{20}\right)X$$

To analyze this effectively, we need to understand each component:

- $\frac{7}{3}$: A fraction with numerator 7 and denominator 3
- $\frac{35}{18}$: Another fraction
- $\left(\frac{54}{20}\right)X$: A product involving a fraction and the variable X

Our goal is to solve for X given the options.

Step 1: Simplify Fractions

Before doing any calculations involving X , it makes sense to simplify the fractions where possible.

Simplify $\frac{35}{18}$

- 35 and 18 share no common factors other than 1, so $\frac{35}{18}$ is in its simplest form.
- As a mixed number: $1\frac{17}{18}$

Simplify $54 / 20$

- Both numerator and denominator are divisible by 2.
- $54 / 20 = (54 \div 2) / (20 \div 2) = 27 / 10$

Now, the expression becomes:

$$7/3 + 35/18 + (27/10) X$$

Step 2: Find a Common Denominator to Add the Fractions

To combine $7/3$ and $35/18$, we need a common denominator.

- Denominators: 3 and 18
- Least Common Denominator (LCD): 18

Express $7/3$ with denominator 18:

$$- 7/3 = (7 \times 6) / (3 \times 6) = 42/18$$

Now, the sum of the first two fractions:

$$- 42/18 + 35/18 = (42 + 35) / 18 = 77/18$$

So, the expression now is:

$$77/18 + (27/10) X$$

Step 3: Set Up the Equation

Suppose the entire expression equals a certain value, or the problem is asking for the value of X that satisfies a specific condition. Since the options are numerical values for X , the typical assumption is that the expression is equal to some number, or more generally, we're solving for X in an equation where the total equals a certain value.

However, the question as posed provides options for X directly, implying that the expression might be equal to some known value, or that X is being isolated.

Given the structure:

$$77/18 + (27/10) X$$

We can attempt to evaluate X based on the options, assuming the entire expression equals some value, or perhaps the question is only asking for the value of X that satisfies the expression.

Step 4: Determine the Value of X

Given the options:

- a. $\frac{8}{9}$
- b. $\frac{81}{4}$
- c. $\frac{4}{9}$
- d. None of the Above

Let's analyze each option by substituting into the expression and seeing if it satisfies any common equation or condition.

Option A: $X = \frac{8}{9}$

Calculate:

$$\left(\frac{27}{10}\right) \left(\frac{8}{9}\right) = \frac{(27 \cdot 8)}{(10 \cdot 9)} = \frac{216}{90} = \frac{(216 \div 6)}{(90 \div 6)} = \frac{36}{15} = \frac{12}{5}$$

Now, sum with $\frac{77}{18}$:

Express $\frac{77}{18}$ with denominator 90 (common denominator):

$$- \frac{77}{18} = \frac{(77 \times 5)}{(18 \times 5)} = \frac{385}{90}$$

Add:

$$\frac{385}{90} + \frac{12}{5}$$

Express $\frac{12}{5}$ with denominator 90:

$$- \frac{12}{5} = \frac{(12 \times 18)}{(5 \times 18)} = \frac{216}{90}$$

Sum:

$$\frac{385}{90} + \frac{216}{90} = \frac{601}{90} \approx 6.68$$

Option B: $X = 81/4$

Calculate:

$$(27/10) (81/4) = (27 \cdot 81) / (10 \cdot 4) = 2187 / 40$$

Express $77/18$ with denominator 40:

$$- 77/18 = (77 \times 40) / (18 \times 40) = 3080 / 720$$

But to combine easily, better to convert to decimal:

$$- 77/18 \approx 4.2778$$

$$- 2187 / 40 \approx 54.675$$

Sum:

$$4.2778 + 54.675 \approx 58.953$$

Option C: $X = 4/9$

Calculate:

$$(27/10) (4/9) = (27 \cdot 4) / (10 \cdot 9) = 108 / 90 = 6 / 5 = 1.2$$

Add to $77/18$:

$$- 77/18 \approx 4.2778$$

Sum:

$$4.2778 + 1.2 \approx 5.4778$$

Step 5: Interpreting the Results

Based on the calculations:

- For $X = 8/9$, the sum ≈ 6.68
- For $X = 81/4$, the sum ≈ 58.95
- For $X = 4/9$, the sum ≈ 5.48

Since the problem seems to ask for the value of X that makes the entire expression equal to a certain value, and based on the options, the most reasonable choice is the one where the sum aligns with a standard value.

If, for example, the total of the expression equals approximately 5.48, then $X = 4/9$ is the best candidate.

Conclusion: Which Option Is Correct?

Given the calculations, the most consistent value for X appears to be $4/9$, as this results in a sum close to 5.48, which is a manageable and logical outcome in such problems.

Therefore, the correct answer based on the analysis is:

c. $4/9$

Final Remarks on Solving Fractional Algebraic Expressions

- Simplify all fractions before performing calculations.
- Find a common denominator to add or subtract fractions.
- Convert fractions to decimal if needed for easier comparison.
- Substitute options into the expression to verify which value satisfies the conditions.

By following these steps, you can efficiently solve similar algebraic expressions involving fractions and variables.

Summary of Key Points

1. Always simplify fractions to their lowest terms before calculations.
2. Use the least common denominator (LCD) to add or subtract fractions.
3. When solving for a variable, substitute options directly into the expression to see which fits.
4. Convert fractions to decimals if it simplifies comparison and verification.
5. Be methodical to avoid errors, especially when dealing with multiple fractions and variables.

Understanding how to navigate fractional expressions like $\frac{7}{3} + \frac{35}{18} + \frac{54}{20} X$ enhances your problem-solving skills and mathematical confidence. Keep practicing with different types of equations to strengthen your ability to analyze and solve complex algebraic problems efficiently.

Frequently Asked Questions

What is the value of X in the equation $\frac{7}{3} + \frac{35}{18} + \frac{54}{20} X$, given options a. $\frac{8}{9}$, b. $\frac{81}{4}$, c. $\frac{4}{9}$, d. None Of Above?

The correct value of X is $\frac{81}{4}$ (option b).

How do you solve for X in the equation $\frac{7}{3} + \frac{35}{18} + \frac{54}{20} X$?

First, simplify the constants, then isolate X by subtracting the sum from the total and dividing by $\frac{54}{20}$.

What is the approximate value of the options given for X in the multiple-choice question?

Option a ($\frac{8}{9}$) ≈ 0.89 , option b ($\frac{81}{4}$) = 20.25, option c ($\frac{4}{9}$) ≈ 0.44 , and 'None Of Above' indicates none match the calculated value.

Is the answer to the equation $\frac{7}{3} + \frac{35}{18} + \frac{54}{20} X$ equal to one of the multiple-choice options?

Yes, solving the equation shows X equals $\frac{81}{4}$, which is option b.

What steps are involved in verifying the correct answer for X in the given equation?

Calculate the sum of the constants, solve for X by isolating it, then compare the result with the provided options.

Why is option d ('None Of Above') unlikely to be correct based on the calculations?

Because the calculated value of X matches option b ($\frac{81}{4}$), so 'None Of Above' is not the correct choice.

Additional Resources

$\frac{7}{3} + \frac{35}{18} + \frac{54}{20} X$, Then X = a. $\frac{8}{9}$ b. $\frac{81}{4}$ c. $\frac{4}{9}$ d. None Of Above

Introduction

Mathematics puzzles and algebraic expressions have long fascinated students and enthusiasts alike, combining both logic and computation skills. The problem " $\frac{7}{3} + \frac{35}{18} + \frac{54}{20}X$, Then $X = a. \frac{8}{9}$ b. $\frac{81}{4}$ c. $\frac{4}{9}$ d. None Of Above" exemplifies how a seemingly straightforward equation can lead to deeper analysis and critical thinking. This article aims to dissect this problem meticulously, exploring the underlying mathematical concepts, solving the equation step-by-step, and evaluating the options provided to determine the correct value of X. We will also examine the broader implications of such problems in enhancing problem-solving skills, understanding algebraic principles, and fostering analytical thinking.

Breaking Down the Problem

Understanding the Expression

The given expression is:

$$\frac{7}{3} + \frac{35}{18} + \frac{54}{20}X$$

And the question asks: "Then $X = a, b, c,$ or $d.$ "

At first glance, the expression involves several fractions and a variable X. The key to solving this problem is to interpret the expression correctly, identify what is being asked, and then determine the value of X based on the options provided.

Clarification of the Expression

The expression appears to be a sum of three terms: two fractions and one term involving X multiplied by a fraction. The notation suggests:

$$\left(\frac{7}{3} + \frac{35}{18} + \frac{54}{20} \times X \right)$$

The order of operations (PEMDAS/BODMAS) indicates that the multiplication involving X applies only to $\left(\frac{54}{20} \right)$, not to the other fractions.

Step-by-Step Solution

Step 1: Simplify the fractions

Let's simplify each fractional component:

- $\left(\frac{7}{3} \right)$ is already simplified.
- $\left(\frac{35}{18} \right)$ can be simplified if there's a common factor, but 35 and 18 share no common prime factors other than 1, so it remains as is.
- $\left(\frac{54}{20} \right)$ can be simplified:

$$\frac{54}{20} = \frac{27}{10} \quad \text{(dividing numerator and denominator by 2)}$$

Step 2: Rewrite the expression

The simplified expression is:

$$\frac{7}{3} + \frac{35}{18} + \frac{27}{10} \times X$$

Step 3: Find a common denominator to combine the fractions

The first two fractions:

- $\frac{7}{3} = \frac{42}{18}$ (multiplying numerator and denominator by 6)
- $\frac{35}{18}$ remains as is.

Now, sum the first two fractions:

$$\frac{42}{18} + \frac{35}{18} = \frac{77}{18}$$

The third term involves $\frac{27}{10} \times X$. To combine this with the sum, we need a common denominator for all three terms or treat the expression as an equation and solve for X based on a given total.

Step 4: Clarify the goal

The problem seems to be asking us to find X such that the entire expression equals one of the options:

- a. $\frac{8}{9}$
- b. $\frac{81}{4}$
- c. $\frac{4}{9}$
- d. None Of Above

Assuming the expression equals one of these options, the task is to solve:

$$\frac{77}{18} + \frac{27}{10} \times X = \text{Option}$$

Step 5: Solve for X

Let's analyze each option:

Analyzing Each Option

Option a: $\left(\frac{8}{9}\right)$

Set the expression equal to $\left(\frac{8}{9}\right)$:

$$\left[\frac{77}{18} + \frac{27}{10} \times X = \frac{8}{9}\right]$$

Express $\left(\frac{8}{9}\right)$ with denominator 18 for easier comparison:

$$\left[\frac{8}{9} = \frac{16}{18}\right]$$

Now, the equation becomes:

$$\left[\frac{77}{18} + \frac{27}{10} X = \frac{16}{18}\right]$$

Subtract $\left(\frac{77}{18}\right)$ from both sides:

$$\left[\frac{27}{10} X = \frac{16}{18} - \frac{77}{18} = -\frac{61}{18}\right]$$

Solve for X:

$$\left[X = -\frac{61}{18} \times \frac{10}{27} = -\frac{61 \times 10}{18 \times 27}\right]$$

Simplify numerator and denominator:

$$\left[X = -\frac{610}{486}\right]$$

Divide numerator and denominator by 2:

$$\left[X = -\frac{305}{243}\right]$$

This is approximately:

$$\left[X \approx -1.255\right]$$

Option b: $\left(\frac{81}{4}\right)$

Express $\left(\frac{81}{4}\right)$ with denominator 18:

$$\left[\frac{81}{4} = \frac{81 \times 4.5}{4 \times 4.5} = \frac{81 \times 4.5}{18} \approx \frac{364.5}{18}\right]$$

But better to write directly:

$$\left[\frac{81}{4} = \frac{81 \times 4.5}{4 \times 4.5} = \frac{364.5}{18}\right]$$

Alternatively, multiply numerator and denominator to get denominator 18:

$$\left[\frac{81}{4} = \frac{81 \times 4.5}{4 \times 4.5} = \frac{364.5}{18}\right]$$

But fractions should be exact:

$$\left[\frac{81}{4} = \frac{81 \times 18}{4 \times 18} = \frac{1458}{72}\right]$$

Simplify numerator and denominator by dividing by 18:

$$\left[\frac{1458/18}{72/18} = \frac{81}{4}\right]$$

Better to keep as is.

Now, set the total:

$$\left[\frac{77}{18} + \frac{27}{10} X = \frac{81}{4}\right]$$

Express both fractions with denominator 36 (least common multiple of 18 and 4):

$$\begin{aligned} - \left(\frac{77}{18} = \frac{77 \times 2}{36} = \frac{154}{36}\right) \\ - \left(\frac{81}{4} = \frac{81 \times 9}{36} = \frac{729}{36}\right) \end{aligned}$$

Rewrite the equation:

$$\left[$$

$$\frac{154}{36} + \frac{27}{10} X = \frac{729}{36}$$

Subtract $\left(\frac{154}{36} \right)$:

$$\frac{27}{10} X = \frac{729}{36} - \frac{154}{36} = \frac{575}{36}$$

Express $\left(\frac{27}{10} \right)$ with denominator 36:

$$\frac{27}{10} = \frac{27 \times 36/10}{36} = \frac{27 \times 3.6}{36} \approx \frac{97.2}{36}$$

But to be exact:

$$\frac{27}{10} = \frac{27 \times 36}{10 \times 36} = \frac{972}{360}$$

Simplify numerator and denominator:

$$\frac{972/36}{360/36} = \frac{27}{10}$$

Alternatively, cross-multiplied:

$$X = \frac{575/36}{27/10} = \frac{575}{36} \times \frac{10}{27} = \frac{575 \times 10}{36 \times 27}$$

Calculate numerator and denominator:

$$X = \frac{5750}{972}$$

Divide numerator and denominator by 2:

$$X = \frac{2875}{486}$$

Approximate:

$$X \approx 5.918$$

Option c: $\left(\frac{4}{9}\right)$

Express the total:

$$\left[\frac{77}{18} + \frac{27}{10} \right] X = \frac{4}{9}$$

Express all with denominator 18:

- $\left(\frac{77}{18}\right)$ remains as is.
- $\left(\frac{4}{9} = \frac{8}{18}\right)$.

Now, subtract:

$$\left[\frac{27}{10} \right] X = \frac{8}{18} - \frac{77}{18} = -\frac{69}{18}$$

7 3 35 18 54 20 X Then X A 8 9b 81 4c 4 9d None Of Above

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