

Algebraic Fractions - Formulae

415 Section 21.2 Solving equations involving fractions

Note: An equation will always have an equal sign.
Solve means to find the value of x

- Method:**
- 1) Find the LCD
 - 2) Write the LCD on each numerator
 - 3) Simplify (Divide the denominator into the LCD)
 - 4) Multiply what is left by the numerator
 - 5) Use stabilizers to bring x parts together and constants to gather
x = number

Example 1

Solve each of these equations:

(i) $\frac{3x}{4} - \frac{x}{2} = 3$ (ii) $\frac{2x-5}{3} = \frac{x-2}{2}$

Example 2

Solve the equation: $\frac{3x-1}{6} - \frac{x-3}{4} = \frac{4}{3}$

Exercise 21.2

Solve the following equations:

1. $\frac{x+3}{2} = 5$ LCD = 2
 $1(x+3) = 5(2)$
 $2x = 10$
 $\div 2 \mid x = 5 \mid \div 2$

2. $\frac{x+5}{3} = 3$
 $1(x+5) = 3(3)$
 $3x + 15 = 9$
 $\div 3 \mid x = -2 \mid \div 3$

3. $\frac{x+2}{4} = 2$
 $1(x+2) = 4(2)$
 $4x + 8 = 8$
 $\div 4 \mid x = 0 \mid \div 4$

4. $\frac{12x-5}{4} = 2$ LCD = 4
 $1(12x-5) = 2(4)$
 $3x = 18$
 $\div 3 \mid x = 6 \mid \div 3$

Solve the following equations:

5. $\frac{x+3}{7} = 10$
 $1(x+3) = 10(7)$
 $7x + 3 = 70$
 $\div 7 \mid x = 10 \mid \div 7$

6. $\frac{x+3}{7} = 2$
 $1(x+3) = 2(7)$
 $3x + 11 = 14$
 $\div 3 \mid x = 1 \mid \div 3$

7. $\frac{3x-1}{4} = 2$ LCD = 4
 $1(3x-1) = 4(2)$ Multiply
 $3x - 1 = 8$
 $\div 3 \mid 3x + 1 = 9 \mid \div 3$
 $x = 3 \mid \div 3$

8. $\frac{3x-1}{4} = 4$
 $1(3x-1) = 4(4)$
 $3x - 1 = 16$
 $\div 3 \mid 3x + 1 = 17 \mid \div 3$
 $x = 11 \mid \div 3$

Solve the following equations:

9. $\frac{2x+1}{4} = \frac{x+3}{2}$ LCD = 6
 $2(2x+1) = 3(x+3)$
 $4x + 2 = 3x + 9$
 $\div 4 \mid 4x + 2 = 3x + 9 \mid \div 4$
 $x = 1/4 \mid \div 4$

10. $\frac{x+5}{2} = \frac{x+2}{3}$ LCD = 3
 $1(x+5) = 1(x+2)$ Cross multiply
 $2x + 5 = 3x + 2$
 $\div 3 \mid 3x + 5 = 4x + 2 \mid \div 3$
 $x = 3 \mid \div 3$

11. $\frac{x-3}{4} = \frac{x+2}{2}$ LCD = 20
 $5(x-3) = 4(x+2)$
 $5x - 15 = 4x + 8$
 $\div 4 \mid 4x - 15 = 8 \mid \div 4$
 $x = 7 \mid \div 4$

12. $\frac{x+2}{4} = \frac{2x-5}{2}$ LCD = 6
 $1(x+2) = 2(2x-5)$
 $x + 2 = 4x - 10$
 $\div 4 \mid x + 2 = 4x - 10 \mid \div 4$
 $12 = 3x - 10 \mid \div 4$
 $4 = x \mid \div 4$

Solve the following equations:

13. $\frac{2x}{5} + \frac{x}{2} = \frac{9}{2}$

14. $\frac{x+3}{4} = \frac{x+5}{2}$ LCD = 12
 $4(x+3) = 2(x+5)$
 $4x + 12 = 2x + 10$
 $\div 4 \mid 5x = 10 \mid \div 4$
 $x = 2 \mid \div 4$

15. $\frac{3x+2}{4} = \frac{x+1}{2}$ LCD = 8
 $2(3x+2) = 4(x+1)$
 $6x + 4 = 4x + 4$
 $1x = 4$

16. $\frac{x+3}{4} = \frac{x+5}{2}$ LCD = 12
 $4(x+3) = 2(x+5)$
 $4x + 12 = 2x + 10$
 $\div 4 \mid 5x = 30 \mid \div 4$
 $x = 6 \mid \div 4$

Solve the following equations:

17. $\frac{2x-1}{3} + \frac{x}{4} = \frac{6}{4}$

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

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

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

Solve the following equations:

21. $\frac{3x-1}{6} - \frac{x-3}{4} = \frac{4}{3}$

22. $\frac{x-2}{5} + \frac{2x-3}{10} = \frac{1}{2}$

23. $\frac{2x-3}{5} + \frac{1}{20} = \frac{x-1}{4}$

24. $\frac{3x-1}{2} - \frac{2x-5}{3} = 2$

Solve the following equations:

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

26. $\frac{2x-1}{4} - \frac{x-1}{5} = 1$

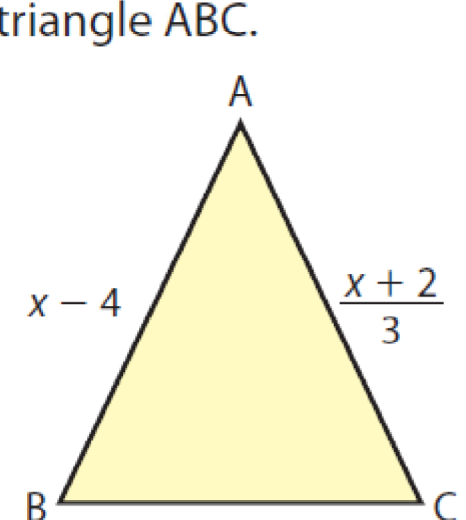
27. $\frac{3x-2}{6} - \frac{3x+1}{4} = \frac{2}{3}$

28. $\frac{3(x-4)}{5} + 3 = \frac{3(x-5)}{2}$

Solve the following equations:

29. $\frac{4x+5}{5} + \frac{2x+7}{2} + \frac{3x}{10}$

30. The diagram shows an isosceles triangle ABC.



- If $|AB| = |AC|$,
- write down an equation in terms of x.
 - work out the length of $|AB|$.

Answers

Exercise 21.2

1. $x = 9$ 2. $x = 5$ 3. $x = 3$
 4. 6 5. 6 6. 11 7. 3 8. 11
 9. $\frac{1}{4}$ 10. 3 11. 7 12. 4 13. 5
 14. 2 15. 4 16. 6 17. 2 18. 30
 19. 2 20. 12 21. 3 22. 3 23. 2
 24. 1 25. 11 26. $3\frac{1}{2}$ 27. -5 28. 30
 29. -3 30. (i) $x - 4 = \frac{x+2}{3}$ (ii) $|AB| = 3$

Fraction Exam Q

a) write as a single fraction

$\frac{10^2x}{8} + \frac{10^5x}{2}$ LCD = 10
 $2(2x) + 5(x)$ Multiply
 $4x + 5x = 9x$
 Single fraction = $\frac{9x}{10}$

b) Hence, or otherwise solve the equation

$\frac{2x}{5} + \frac{x}{2} = \frac{9}{2}$
 $\frac{10^2x}{10} = \frac{10^5x}{2}$ LCD = 10
 $1(9x) = 5(9)$ multiply
 $\div 9 \mid 9x = 45 \mid \div 9$
 $x = 5 \mid \div 9$