Algebraic expressions

29 January 2020 09:45

① Express as a single fraction

$$\text{fraction} = \frac{\text{numerator}}{\text{denominator}}$$

Eg1) $\frac{(12)^3}{4_1} + \frac{(12)^4}{3_1}$ LCD – Lowest common denominator

LCD = 12

$$\frac{3(3)+4(1)}{12} = \frac{9+4}{12} = \frac{13}{12}$$

Eg2) $\frac{6x^{3\,2}}{2_1} + \frac{6x^2}{3_1}$ LCD = 6

$$\frac{3(x)+2(x)}{6} = \frac{3x+2x}{6} = \frac{5x}{6}$$

Eg3) $\frac{12(2x+3)^{3\,2}}{4_1} + \frac{12x^4}{3_1}$ LCD = 12

$$\Rightarrow \frac{3(2x+3)+4(x)}{12}$$

$= \frac{6x + 9 + 4x}{12}$ Ans $= \frac{10x + 9}{12}$

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Section 1.6 Adding algebraic fractions

Notes

To express $\frac{3}{4}+\frac{2}{3}$ as a single fraction, we express both fractions with 12 as denominator.

$$\frac{3}{4}+\frac{2}{3}=\frac{9}{12}+\frac{8}{12}=\frac{17}{12}$$

This can be done more concisely as follows:

$$\frac{3}{4}+\frac{2}{3}=\frac{3(3)+2(4)}{12}=\frac{9+8}{12}=\frac{17}{12}=1\frac{5}{12}.$$

Similarly $\frac{6}{7}-\frac{2}{3}=\frac{6(3)-2(7)}{21}=\frac{18-14}{21}=\frac{4}{21}$

Algebraic fractions can be added or subtracted in the same way as numerical fractions.

Example 1

Express as a single fraction $\frac{4x-3}{4} - \frac{x}{3}$.

Example 2

Express $\frac{5}{x+3} - \frac{2}{x-4}$ as a single fraction.

Exercise 1.6

Answers: **1.** $\frac{13}{12}$ **2.** $\frac{13}{10}$ **3.** $\frac{11}{24}$

Express each of the following as a single fraction:

1. $\frac{3}{4}+\frac{1}{3}$ **2.** $\frac{3}{5}+\frac{7}{10}$ **3.** $\frac{5}{8}-\frac{1}{6}$

Exercise 1.6

Answers: **4.** $\frac{5x}{6}$ **5.** $\frac{9x}{4}$ **6.** $\frac{7x}{6}$

Express each of the following as a single fraction:

4. $\frac{x}{2}+\frac{x}{3}$ **5.** $\frac{3x}{4}+\frac{3x}{2}$ **6.** $\frac{5x}{3}-\frac{x}{2}$

Exercise 1.6

Answers: **7.** $\frac{10x+9}{12}$ **8.** $\frac{9x-17}{6}$ **9.** $\frac{17x-24}{15}$

Express each of the following as a single fraction:

7. $\frac{2x+3}{4}+\frac{x}{3}$ **8.** $\frac{3x-1}{3}+\frac{x-5}{2}$ **9.** $\frac{4x-3}{5}+\frac{x-3}{3}$

Exercise 1.6

Answers: **10.** $\frac{-x-6}{6}$ **11.** $\frac{3x+5}{12}$ **12.** $\frac{13x+7}{20}$

Express each of the following as a single fraction:

10. $\frac{3x-4}{6}-\frac{2x+1}{3}$ **11.** $\frac{3x-2}{6}-\frac{x-3}{4}$ **12.** $\frac{3x-1}{4}-\frac{x}{10}+\frac{3}{5}$

Exercise 1.6

Answers: **13.** $\frac{2x+3}{x(x+3)}$ **14.** $\frac{5x+15}{x(x+5)}$

Express each of the following as a single fraction:

13. $\frac{1}{x+3}+\frac{1}{x}$ **14.** $\frac{2}{x+5}+\frac{3}{x}$

Exercise 1.6

Answers: **15.** $\frac{5x+14}{(x+2)(x+4)}$ **16.** $\frac{14x-15}{(2x-1)(2x-3)}$

Express each of the following as a single fraction:

15. $\frac{2}{x+2}+\frac{3}{x+4}$ **16.** $\frac{4}{2x-1}+\frac{3}{2x-3}$

Exercise 1.6

Answers: **17.** $\frac{25x - 7}{(4x - 1)(3x - 1)}$ **18.** $\frac{-x + 17}{(3x - 1)(x + 3)}$

Express each of the following as a single fraction:

17. $\frac{3}{4x - 1} + \frac{4}{3x - 1}$ **18.** $\frac{5}{3x - 1} - \frac{2}{x + 3}$

Exercise 1.6

Answers: **19.** $\frac{22}{(3x - 1)(2x + 3)}$ **20.** $\frac{-3x + 13}{4(3x - 5)}$

Express each of the following as a single fraction:

19. $\frac{6}{3x - 1} - \frac{4}{2x + 3}$ **20.** $\frac{2}{3x - 5} - \frac{1}{4}$

Exercise 1.6

Answer: **21.** $\dfrac{-x+20}{(2x-7)(3x-5)}$

Express each of the following as a single fraction:

21. $\dfrac{3}{2x-7}-\dfrac{5}{3x-5}$

Exercise 1.6

Answer: **22.** $\dfrac{-x-7}{(2x-1)(x-2)}$

22. Express $\dfrac{5}{2x-1}-\dfrac{3}{x-2}$ as a single fraction and verify your answer by letting $x=3$ in the given expression and in your answer.

Exercise 1.6

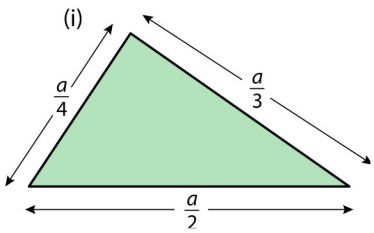
Answers: $k = 34$

23. If $\frac{6}{3x-4} - \frac{4}{2x+3} = \frac{k}{(3x-4)(2x+3)}$, find k where $k \in N$.

Exercise 1.6

Answer: (i) $\frac{13a}{12}$

24. Write down an expression for the perimeter of these shapes.
Write each expression as a single fraction.

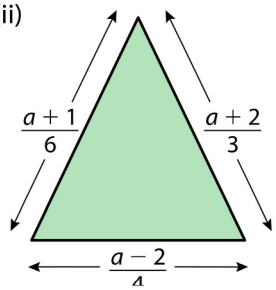


Exercise 1.6

Answer: (ii) $\frac{9a + 4}{12}$

24. Write down an expression for the perimeter of these shapes.
Write each expression as a single fraction.

(ii)



Exercise 1.6

Answers: (iii) $\frac{7a - 5}{6}$

24. Write down an expression for the perimeter of these shapes.
Write each expression as a single fraction.

(iii)