



## National 5 Mathematics

### Algebraic Fractions - Solutions

Marks are indicated in brackets after each question number

#### **2014 Paper 2 Question 9, (3)**

$$\begin{aligned}\frac{7}{x+5} - \frac{3}{x} &= \frac{7x}{x(x+5)} - \frac{3(x+5)}{x(x+5)} \\ &= \frac{7x - 3(x+5)}{x(x+5)} \\ &= \frac{7x - 3x - 15}{x(x+5)} \\ &= \frac{4x - 15}{x(x+5)}\end{aligned}$$

#### **2015 Paper 1 Question 12, (3)**

$$\begin{aligned}\frac{x^2 - 4x}{x^2 + x - 20} \\ &= \frac{x(x-4)}{(x+5)(x-4)} \\ &= \frac{x}{x+5}\end{aligned}$$

#### **2016 Paper 2 Question 13, (3)**

$$\begin{aligned}\frac{3}{x-2} + \frac{5}{x+1} \\ &= \frac{3(x+1)}{(x-2)(x+1)} + \frac{5(x-2)}{(x-2)(x+1)} \\ &= \frac{3(x+1) + 5(x-2)}{(x-2)(x+1)} \\ &= \frac{8x - 7}{(x-2)(x+1)}\end{aligned}$$



**2017 Paper 1 Question 11, (2)**

$$\begin{aligned}\frac{3}{a^2} - \frac{2}{a} &= \frac{3}{a^2} - \frac{2a}{a^2} \\ &= \frac{3 - 2a}{a^2}\end{aligned}$$

**2017 Paper 2 Question 9, (1) (3)**

a)  $4x^2 - 25 = (2x)^2 - 5^2$

$$= (2x - 5)(2x + 5)$$

b)  $\frac{4x^2 - 25}{2x^2 - x - 10} = \frac{(2x - 5)(2x + 5)}{(2x - 5)(x + 2)}$

$$= \frac{2x + 5}{x + 2}$$

**2018 Paper 2 Question 15, (3)**

$$\begin{aligned}\frac{n}{n^2 - 4} \div \frac{3}{n - 2} \\ &= \frac{n}{n^2 - 4} \times \frac{n - 2}{3} \\ &= \frac{n(n - 2)}{3(n^2 - 4)} \\ &= \frac{n(n - 2)}{3(n - 2)(n + 2)} \\ &= \frac{n}{3(n + 2)}\end{aligned}$$



**2019 Paper 2 Question 15, (3)**

$$\begin{aligned}\frac{4}{x-2} - \frac{3}{x+5} &= \frac{4(x+5)}{(x-2)(x+5)} - \frac{3(x-2)}{(x-2)(x+5)} \\ &= \frac{4(x+5) - 3(x-2)}{(x-2)(x+5)} \\ &= \frac{4x + 20 - 3x + 6}{(x-2)(x+5)} \\ &= \frac{x + 26}{(x-2)(x+5)}\end{aligned}$$

**2022 Paper 1 Question 12, (2)**

$$\begin{aligned}\frac{4}{x+2} \div \frac{5}{(x+2)^2} \\ &= \frac{4}{x+2} \times \frac{(x+2)^2}{5} \\ &= \frac{4(x+2)^2}{5(x+2)} \\ &= \frac{4(x+2)}{5}\end{aligned}$$

**2022 Paper 2 Question 12, (3)**

$$\begin{aligned}\frac{2ab + 6a}{b^2 - 9} \\ &= \frac{2a(b+3)}{(b+3)(b-3)} \\ &= \frac{2a}{(b-3)}\end{aligned}$$



**2023 Paper 2 Question 10, (3)**

$$\begin{aligned}\frac{7}{x-3} - \frac{2}{x} &= \frac{7x}{x(x-3)} - \frac{2(x-3)}{x(x-3)} \\ &= \frac{7x - 2(x-3)}{x(x-3)} \\ &= \frac{7x - 2x + 6}{x(x-3)} \\ &= \frac{5x + 6}{x(x-3)}\end{aligned}$$

**2023 Paper 2 Question 12, (3)**

$$\begin{aligned}\frac{x^2 - 16}{x^2 + x - 20} \\ &= \frac{(x-4)(x+4)}{(x+5)(x-4)} \\ &= \frac{(x+4)}{(x+5)}\end{aligned}$$