National 5 Mathematics

Algebraic Fractions - Solutions

Marks are indicated in brackets after each question number

2014 Paper 2 Question 9, (3)

$$\frac{7}{x+5}-\frac{3}{x}=\frac{7x}{x(x+5)}-\frac{3(x+5)}{x(x+5)}$$

$$=\frac{7x-3(x+5)}{x(x+5)}$$

$$=\frac{7x-3x-15}{x(x+5)}$$

$$=\frac{4x-15}{x(x+5)}$$

2015 Paper 1 Question 12, (3)

$$\frac{x^2-4x}{x^2+x-20}$$

$$=\frac{x(x-4)}{(x+5)(x-4)}$$

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

2016 Paper 2 Question 13, (3)

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

$$=\frac{3(x+1)}{(x-2)(x+1)}+\frac{5(x-2)}{(x-2)(x+1)}$$

$$=\frac{3(x+1)+5(x-2)}{(x-2)(x+1)}$$

$$=\frac{8x-7}{(x-2)(x+1)}$$

2017 Paper 1 Question 11, (2)

$$\frac{3}{a^2} - \frac{2}{a} = \frac{3}{a^2} - \frac{2a}{a^2}$$

$$= \frac{3 - 2a}{a^2}$$

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)

$$\frac{n}{n^2 - 4} \div \frac{3}{n - 2}$$

$$= \frac{n}{n^2 - 4} \; x \; \frac{n - 2}{3}$$

$$= \frac{n(n - 2)}{3(n^2 - 4)}$$

$$= \frac{n(n - 2)}{3(n - 2)(n - 2)}$$

$$= \frac{n}{3(n - 2)}$$

2019 Paper 2 Question 15, (3)

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

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

$$=\frac{4x+20-3x+6}{(x-2)(x+5)}$$

$$=\frac{x+26}{(x-2)(x+5)}$$

2022 Paper 1 Question 12, (2)

$$\frac{4}{x+2}\div\frac{5}{(x+2)^2}$$

$$=\frac{4}{x+2}\ x\ \frac{(x+2)^2}{5}$$

$$=\frac{4(x+2)^2}{5(x+2)}$$

$$=\frac{4(x+2)}{5}$$

2022 Paper 2 Question 12, (3)

$$\frac{2ab+6a}{b^2-9}$$

$$=\frac{2a(b+3)}{(b+3)(b-3)}$$

$$=\frac{2a}{(b-3)}$$

2023 Paper 2 Question 10, (3)

$$\frac{7}{x-3}-\frac{2}{x}=\frac{7x}{x(x-3)}-\frac{2(x-3)}{x(x-3)}$$

$$=\frac{7x-2(x-3)}{x(x-3)}$$

$$=\frac{7x-2x+6)}{x(x-3)}$$

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

2023 Paper 2 Question 12, (3)

$$\frac{x^2-16}{x^2+x-20}$$

$$=\frac{(x-4)(x+4)}{(x+5)(x-4)}$$

$$=\frac{(x+4)}{(x+5)}$$

2024 Paper 2 Question 6, (1) (2)

a) $y^2-6y=y(y-6)$

b) $\frac{y^2-6y}{y^2-3y-18}=\frac{y(y-6)}{(y-6)(y+3)}$

$$=\frac{y}{y+3}$$

2024 Paper 2 Question 12, (3)

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

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

$$=\frac{2x-8+3x+15}{(x+5)(x-4)}$$

$$=\frac{5x+7}{(x+5)(x-4)}$$

2025 Paper 1 Question 14, (3)

$$\frac{5}{x-1}-\frac{4}{x}=\frac{5x}{x(x-1)}-\frac{4(x-1)}{x(x-1)}$$

$$=\frac{5x-4(x-1)}{x(x-1)}$$

$$=\frac{5x-4x+4}{x(x-1)}$$

$$=\frac{x+4}{x(x-1)}$$