Algebraic Fractions: exam questions

10 questions · 30 marks · mark schemes at the end

Name _____ Date _____ Score / 30

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/algebraic-fractions

1. **3 marks**

Simplify fully $\dfrac{x^2 - 9}{x^2 + x - 6}$.

2. **3 marks**

Write $\dfrac{3}{x + 2} + \dfrac{2}{x - 1}$ as a single fraction in its simplest form.

3. **3 marks**

Simplify fully $\dfrac{2x^2 + 7x + 3}{4x^2 - 1}$.

4. 4 marks

Solve $\frac{3}{x+1} + \frac{2}{x} = 2$.

5. 3 marks

Simplify fully $\frac{x^2 - 4x}{3x} \div \frac{x^2 - 16}{6}$.

6. 2 marks

Write $\frac{x+1}{4} - \frac{x-3}{6}$ as a single fraction in its simplest form.

7. 3 marks

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

8. 3 marks

Show that $\frac{1}{x-2} - \frac{1}{x+2} = \frac{4}{x^2-4}$.

9. 2 marks

Simplify fully $\frac{6x^2y}{9xy^3}$.

10. 4 marks

Solve $\frac{5}{x-1} - \frac{3}{x+1} = 1$. Give your answers correct to 3 significant figures.

Answers and worked solutions

Question 1 — 3 marks

M1 $(x+3)(x-3)$

M1 $(x+3)(x-2)$

A1 $\dfrac{x-3}{x-2}$

Answer: $\dfrac{x-3}{x-2}$

Question 2 — 3 marks

M1 common denominator $(x+2)(x-1)$

M1 $\dfrac{3(x-1)+2(x+2)}{(x+2)(x-1)}$

A1 $\dfrac{5x+1}{(x+2)(x-1)}$

Answer: $\dfrac{5x+1}{(x+2)(x-1)}$

Question 3 — 3 marks

M1 $(2x+1)(x+3)$

M1 $(2x+1)(2x-1)$

A1 $\dfrac{x+3}{2x-1}$

Answer: $\dfrac{x+3}{2x-1}$

Question 4 — 4 marks

M1 $3x+2(x+1)=2x(x+1)$

M1 $2x^2-3x-2=0$

M1 $(2x+1)(x-2)=0$

A1 $x=2$ or $x=-\frac{1}{2}$

Answer: $x=2$ or $x=-\frac{1}{2}$

Question 5 — 3 marks

M1 $\dfrac{x(x-4)}{3x}\times\dfrac{6}{(x+4)(x-4)}$

M1 a correct cancellation of x or $(x-4)$

A1 $\dfrac{2}{x+4}$

Answer: $\dfrac{2}{x+4}$

Question 6 — 2 marks

M1 $\dfrac{3(x+1)-2(x-3)}{12}$

A1 $\dfrac{x+9}{12}$

Answer: $\dfrac{x+9}{12}$

Question 7 — 3 marks

M1 $3(x+3)+4(2x-1)=60$

M1 $11x+5=60$

A1 $x=5$

Answer: $x=5$

Question 8 — 3 marks

M1 $\dfrac{(x+2)-(x-2)}{(x-2)(x+2)}$

M1 denominator x^2-4

A1 $\dfrac{4}{x^2-4}$ shown

Answer: shown

Question 9 — 2 marks

M1 two of $\frac{2}{3}$, x, $\dfrac{1}{y^2}$

A1 $\dfrac{2x}{3y^2}$

Answer: $\dfrac{2x}{3y^2}$

Question 10 — 4 marks

M1 $5(x+1)-3(x-1)=(x-1)(x+1)$

M1 $x^2-2x-9=0$

M1 $x=\dfrac{2\pm\sqrt{4+36}}{2}$

A1 $x=4.16$ or $x=-2.16$

Answer: $x=4.16$ or $x=-2.16$

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/algebraic-fractions
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