



THIRD SPACE
LEARNING

GCSE Exam Questions

Algebraic Fractions | Algebra

GCSE Exam Questions: Algebraic Fractions

1) (a) Simplify the algebraic fraction:

$$\frac{6x^2y^2}{8x^3y} \div 3xy$$

(3)

(b) Hence solve the equation:

$$\frac{6x^2y^2}{8x^3y} \div 3xy = 2x$$

(4)
(7 marks)

2) Simplify fully:

$$\frac{3 + \sqrt{3}}{6 + \sqrt{3}} + \sqrt{3}.$$

Write your answer in the form $\frac{a + b\sqrt{3}}{c}$
where a , b , and c are integers.

(5 marks)

3) (a) Simplify the fraction:

$$\frac{12x^2 + 42x + 18}{24x^2 - 6}$$

(3)

(b) State the value of x for which the fraction is undefined.

(1)
(4 marks)

GCSE Exam Questions: Algebraic Fractions

4) (a) Simplify fully:

$$\frac{3}{x^2} + \frac{2}{3x^2} + \frac{3}{5x^2}$$

(2)

(b) Hence solve:

$$\frac{3}{x^2} + \frac{2}{3x^2} + \frac{3}{5x^2} = \frac{x}{15}$$

(3)
(5 marks)

GCSE Exam Questions: Algebraic Fractions Answers

	Question	Answer	Marks
1) (a)	Simplify the algebraic fraction: $\frac{6x^2y^2}{8x^3y} \div 3xy$	(a) $\frac{6x^2y^2}{8x^3y} \div 3xy$ $= \frac{6x^2y^2}{8x^3y} \times \frac{1}{3xy}$ $= \frac{6x^2y^2}{24x^4y^2}$ $= \frac{1}{4x^2}$	(1) (1) (1)
(b)	Hence solve the equation: $\frac{6x^2y^2}{8x^3y} \div 3xy = 2x$	(b) $\frac{1}{4x^2} = 2x$ $1 = 8x^3$ $x^3 = \frac{1}{8}$ $x = \frac{1}{2}$	(1) (1) (1) (1)
2)	Simplify fully: $\frac{3 + \sqrt{3}}{6 + \sqrt{3}} + \sqrt{3}.$ Write your answer in the form $\frac{a + b\sqrt{3}}{c}$ where a , b , and c are integers.	$\frac{3 + \sqrt{3}}{6 + \sqrt{3}} + \sqrt{3} = \frac{3 + \sqrt{3}}{6 + \sqrt{3}} + \frac{\sqrt{3}(6 + \sqrt{3})}{(6 + \sqrt{3})}$ $= \frac{3 + \sqrt{3} + 6\sqrt{3} + 3}{6 + \sqrt{3}}$ $= \frac{6 + 7\sqrt{3}}{6 + \sqrt{3}}$ $= \frac{(6 + 7\sqrt{3})(6 - \sqrt{3})}{(6 + \sqrt{3})(6 - \sqrt{3})}$ $= \frac{36 - 6\sqrt{3} + 42\sqrt{3} - 21}{36 - 3}$ $= \frac{15 + 36\sqrt{3}}{33}$ $= \frac{5 + 12\sqrt{3}}{11}$ $a = 5, b = 12, c = 11$	(1) (1) (1) (1)

GCSE Exam Questions: Algebraic Fractions Answers

	Question	Answer	Marks
3) (a)	Simplify the fraction: $\frac{12x^2 + 42x + 18}{24x^2 - 6}$	(a) $\frac{12x^2 + 42x + 18}{24x^2 - 6} = \frac{6(2x^2 + 7x + 3)}{6(4x^2 - 1)}$ $= \frac{2x^2 + 7x + 3}{4x^2 - 1}$ $= \frac{(2x + 1)(x + 3)}{(2x + 1)(2x - 1)}$ $= \frac{x + 3}{2x - 1}$	(1) (1) (1)
(b)	State the value of x for which the fraction is undefined.	(b) The fraction is undefined when the denominator is equal to 0. $2x - 1 = 0$ $x = \frac{1}{2}$	(1)
4) (a)	Simplify fully: $\frac{3}{x^2} + \frac{2}{3x^2} + \frac{3}{5x^2}$	(a) $\frac{3}{x^2} + \frac{2}{3x^2} + \frac{3}{5x^2}$ $= \frac{45}{15x^2} + \frac{10}{15x^2} + \frac{9}{15x^2}$ $= \frac{64}{15x^2}$	(1) (1)

$$\frac{3}{x^2} + \frac{2}{3x^2} + \frac{3}{5x^2} = \frac{64}{15x^2}$$

$$\frac{64}{15x^2} = \frac{x}{15}$$

$$64 = \frac{15x^3}{15}$$

Where to go next?

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