



## Lite GCSE Maths

### Algebraic Fractions 1

Name: \_\_\_\_\_

Class: \_\_\_\_\_

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Author:

Date:

Time: 28

Marks: 25

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Comments:

Q1. Solve  $\frac{10}{2x-1} - \frac{3}{x} = 3$

$$\begin{aligned}
 10x - 3(2x-1) &= 3x(2x-1) \\
 10x - 6x + 3 &= 6x^2 - 3x \\
 4x + 3 &= 6x^2 - 3x \\
 0 &= 6x^2 - 7x - 3 \\
 6x - 3 &= -18 \\
 +2 - 9 &= 
 \end{aligned}$$

$$\begin{aligned}
 0 &= 6x^2 + 2x - 9x - 3 \\
 0 &= 2x(3x+1) - 3(3x+1) \\
 0 &= (2x-3)(3x+1)
 \end{aligned}$$

$$\begin{aligned}
 2x - 3 &= 0 & 3x + 1 &= 0 \\
 2x &= 3 & 3x &= -1 \\
 x &= \frac{3}{2} & x &= -\frac{1}{3}
 \end{aligned}$$

Answer  $x = \frac{3}{2}$ ,  $x = -\frac{1}{3}$  (Total 6 marks)

Q2. Simplify fully  $\frac{18x^2 - 12x}{18x^2 - 8}$

$$\frac{18x^2 - 12x}{18x^2 - 8}$$

$$= \frac{6x(3x-2)}{2(9x^2-4)}$$

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

Answer

$$= \frac{3x}{3x+2}$$

(Total 4 marks)

- Q3.** The rule for this sequence is that each term is the mean of the two previous terms.

$$\boxed{a} \quad x \quad y \quad \frac{x+y}{2} \quad \boxed{b}$$

- (a) Find an expression for  $a$  in terms of  $x$  and  $y$ .

$$y = \frac{a+x}{2} \Rightarrow 2y = a+x \\ 2y-x = a$$

Answer .....  $a = 2y-x$

(2)

- (b) Find an expression for  $b$  in terms of  $x$  and  $y$ .

Simplify your answer.

$$b = \frac{y + \frac{x+y}{2}}{2} = \frac{2y+x+y}{2}$$

Answer .....  $b = \frac{3y+x}{4}$

(2)  
(Total 4 marks)

- Q4.** (a) (i) Factorise  $x^2 - x - 2 = (x+1)(x-2)$

Answer .....

(2)

(ii) Hence, solve  $x^2 - x - 2 = 0$   $(x+1)(x-2) = 0$

Answer .....  $x = -1, x = +2$

(1)

(b) Simplify  $\frac{3x+2}{x^2 - x - 2} + \frac{1}{x+1}$

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

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

Answer  $\frac{4x}{(x+1)(x-2)}$

(3)  
(Total 6 marks)

Q5. Solve the equation  $\frac{x}{x+1} - \frac{2}{x-1} = 1$

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

$$x(x-1) - 2(x+1) = x^2 - 1$$

$$x^2 - x - 2x - 2 = x^2 - 1$$

$$x^2 - 3x - 2 = x^2 - 1$$

$$-3x = +1$$

$$x = -\frac{1}{3}$$

Answer  $x = -\frac{1}{3}$

(Total 5 marks)

