

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

Level 2 Further Maths



Algebraic Fractions

Corbettmaths

Ensure you have: Pencil or pen

### Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

[www.corbettmaths.com/more/further-maths/](http://www.corbettmaths.com/more/further-maths/)



1. Simplify  $\frac{(x-y)^3}{(x-y)}$

$$\frac{(x-y)^2}{\dots} \quad (1)$$

2. Simplify  $\frac{x^2 + 2x - 24}{x^2 - 11x + 28}$

$$\frac{(x+6)(x-4)}{(x-4)(x-7)}$$

$$\frac{x+6}{x-7} \dots \quad (2)$$

3. Simplify  $\frac{35x - 14y}{15x^2 - 6xy}$

$$\frac{7(5x - 2y)}{3x(5x - 2y)}$$

$$\frac{7}{3x} \dots \quad (3)$$

4. Simplify  $\frac{2x^2 - 19x + 24}{2x^2 - x - 3}$

$$\frac{(x-8)(2x-3)}{(x+1)(2x-3)}$$

$$\frac{x-8}{x+1}$$

.....  
(3)

5. Simplify  $\frac{2y - 2y^3}{y^2 + y}$

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

$$\frac{2-2y}{y}$$

.....  
(4)

6. Simplify  $\frac{27x^3 - 12x}{3x(12x^2 + 5x - 2)}$

$$\frac{3x(9x^2 - 4)}{3x(4x-1)(3x+2)} = \frac{3x(3x-2)(3x+2)}{3x(4x-1)(3x+2)}$$

$$\frac{3x-2}{4x-1}$$

.....  
(4)

7. Work out  $\frac{3}{4x^2} + \frac{5}{3x}$

Give your answer as a single fraction in its simplest form.

$$\frac{9x}{12x^2} + \frac{20x}{12x^2} = \frac{20x + 9}{12x^2}$$

.....  
(2)

8. Work out  $\frac{6a^3b^2}{8} \times \frac{8}{ab^4}$

Give your answer as a single fraction in its simplest form.

$$\frac{48a^3b^2}{8ab^4}$$

$$\frac{6a^2}{b^2}$$

.....  
(2)

9. Work out  $\frac{xyz}{w} \div \frac{wy}{xz}$

Give your answer as a single fraction in its simplest form.

$$\frac{xyz}{w} \times \frac{xz}{wy} = \frac{x^2yz^2}{w^2y}$$

$$\frac{x^2z^2}{w^2}$$

.....  
(2)

10. Work out  $\frac{ac}{5} + \frac{4}{c}$

Give your answer as a single fraction in its simplest form.

$$\frac{ac^2}{5c} + \frac{20}{5c} = \frac{20+ac^2}{5c}$$

$$\frac{20+ac^2}{5c}$$

(2)

11. Work out  $\frac{5}{12x} + \frac{3}{4x^2}$

Give your answer as a single fraction in its simplest form.

$$\frac{5x}{12x^2} + \frac{9}{12x^2} = \frac{5x+9}{12x^2}$$

$$\frac{5x+9}{12x^2}$$

(3)

12. Work out  $\frac{1-x}{x+7} - \frac{4}{x-2}$

Give your answer as a single fraction in its simplest form.

$$\frac{(1-x)(x-2) - 4(x+7)}{(x+7)(x-2)} = \frac{x-2-x^2+2x-4x-28}{(x+7)(x-2)}$$

$$\frac{-x^2 - x - 30}{(x-2)(x+7)}$$

(3)

13. Simplify  $\frac{14}{x^2-5x+6} \div \frac{7}{x^2+3x-10}$

$$\frac{14}{x^2-5x+6} \times \frac{x^2+3x-10}{7} = \frac{2(x^2+3x-10)}{x^2-5x+6}$$

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

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

(4)

14. Simplify  $\frac{3x^2 + 8x - 3}{\cancel{25} \ 5} \times \frac{\cancel{30} \ 6}{6x^2 + 13x - 5}$

$$\frac{6(3x-1)(x+3)}{5(2x+5)(3x-1)}$$

$$\frac{6(x+3)}{5(2x+5)}$$

(5)

15. Simplify  $\frac{x^3 - x}{x + 2} \div \frac{x^2 - x}{x^2 - 5x - 14}$

$$\frac{x(x^2-1)}{x+2} \times \frac{(x-7)(x+2)}{x(x-1)}$$

$$\frac{\cancel{x}(x/1)(x+1)}{\cancel{x}+2} \times \frac{(x-7)(x+2)}{\cancel{x}(x-1)}$$

$$\frac{(x+1)(x-7)}{\dots\dots\dots}$$

(5)

16. Simplify  $\frac{x+3}{x^3} \times \frac{x^7}{x+6} \div \frac{x^2}{5x+30}$

$$\frac{x+3}{x^3} \times \frac{x^{\cancel{7}^2}}{x+6} \times \frac{5(\cancel{x+6})}{x^{\cancel{2}}}$$

$$\frac{5x^2(x+3)}{\dots\dots\dots}$$

(4)

17. Solve  $\frac{25x}{54} = \frac{4}{5x^2}$

$$125x^3 = 216$$

$$x^3 = \frac{216}{125}$$

$$x = \frac{6}{5}$$

(3)



18. Solve  $\frac{2x-5}{7} - \frac{2x-1}{2} = 3$

$$\frac{4x-10}{14} - \frac{14x-7}{14} = 3$$

$$\frac{-10x-3}{14} = 3$$

$$-10x-3 = 42$$

$$-10x = 45$$

$$x = -4.5$$

(4)

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

$$\frac{6x+6}{12} + \frac{6x-3}{12} + \frac{4x+8}{12} = 1$$

$$\frac{16x+11}{12} = 1$$

$$16x+11 = 12$$

$$16x = 1$$

$$x = \frac{1}{16}$$

(4)

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

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

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

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

$$4x = x^2 + 2x - 3$$

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

$$(x-3)(x+1) = 0$$

$$x = -1 \quad \text{or} \quad x = 3$$

.....  
(4)

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

Give your solutions to 3 significant figures

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

$$2x+8 - 6x+9 = 2(2x^2+5x-12)$$

$$-4x+17 = 4x^2+10x-24$$

$$0 = 4x^2+14x-41$$

$$a=4 \quad b=14 \quad c=-41$$

$$x = 1.89863 \dots \quad x = -5.39863 \dots$$

$$x = 1.90 \quad \text{or} \quad x = -5.4$$

$$\underline{\underline{x = 1.9 \quad \text{or} \quad x = -5.4}}$$

(5)

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

Give your solutions to 3 significant figures

$$\frac{(x+1)(x-4) + 2x-6}{(x-3)(x-4)} = 2$$

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

$$x^2 - x - 10 = 2(x-3)(x-4)$$

$$x^2 - x - 10 = 2(x^2 - 7x + 12)$$

$$x^2 - x - 10 = 2x^2 - 14x + 24$$

$$0 = x^2 - 13x + 34$$

$$a=1 \quad b=-13 \quad c=34$$

$$x = 3.63 \text{ or } x = 9.37$$

(5)

23.  $A = \frac{8}{x+1}$  and  $B = \frac{2x+5}{x}$

Given  $5 - A - B = 0$

Work out the possible values of  $x$ .

Give your solutions to two decimal places.

$$5 - \frac{8}{x+1} - \frac{2x+5}{x} = 0$$

$$\frac{8}{x+1} + \frac{2x+5}{x} = 5$$

$$\frac{8x}{x(x+1)} + \frac{(2x+5)(x+1)}{x(x+1)} = 5$$

$$8x + 2x^2 + 2x + 5x + 5 = 5x(x+1)$$

$$2x^2 + 15x + 5 = 5x^2 + 5x$$

$$0 = 3x^2 - 10x - 5$$

$$a = 3 \quad b = -10 \quad c = -5$$

$$x = 3.77 \quad \text{or} \quad x = -0.44$$

.....  
(6)