Name:

Exam Style Questions

Algebraic Fractions

Corbettmaths

Equipment needed: Pen

Guidance

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

Video Tutorial

www.corbettmaths.com/contents

Videos 21, 22, 23, 24

Answers and Video Solutions

1. Simplify fully

$$\frac{x}{3}+\frac{x}{4}$$

$\frac{4x}{12} + \frac{3x}{12} = \frac{7x}{12}$

$\frac{7x}{12}$

.....

(2)

2. Express as a single fraction

$$\frac{w}{2}-\frac{w+1}{7}$$

$\frac{5w-2}{14}$

$\frac{7w - 2(w+1)}{14}$

$\frac{7w - 2w - 2}{14}$

$\frac{5w-2}{14}$

.....

(3)

3. Express as a single fraction

$$\frac{v+3}{2}+\frac{2v+1}{5}$$

$\frac{5v+15}{10} + \frac{4v+2}{10}$

$\frac{9v+17}{10}$

$\frac{9v+17}{10}$

.....

(3)

4. Express as a single fraction

$$\frac{w}{7} - \frac{w+2}{5}$$

$\frac{5w}{35} - \frac{7w+14}{35}$

$\frac{-2w-14}{35}$

$\frac{-2w-14}{35}$

.....

(3)

5. Simplify

$$\frac{5}{x} + \frac{7}{6x}$$

$\frac{30}{6x} + \frac{7}{6x}$

$\frac{37}{6x}$

$\frac{37}{6x}$

.....

(3)

6. Simplify

$$\frac{3}{2w} + \frac{5}{3w}$$

$\frac{9}{6w} + \frac{10}{6w} = \frac{19}{6w}$

$\frac{19}{6w}$

.....

(3)

7. Simplify

$$\frac{2}{3y} - \frac{1}{5y}$$

$\frac{10}{15y} - \frac{3}{15y} = \frac{7}{15y}$

$\frac{7}{15y}$

.....

(3)

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8. Express as a single fraction

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

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

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

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

.....

(3)

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9. Express as a single fraction.

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

$\frac{9x+3}{12} + \frac{8x-4}{12}$

$\frac{17x-1}{12}$

$\frac{17x-1}{12}$

.....

(3)

10. Simplify

$$\frac{w}{2} \times \frac{w}{4}$$

$\frac{w^2}{8}$

.....

(1)

11. Simplify fully.

$$\frac{3a}{2} \times \frac{4}{5a} = \frac{12a}{10a}$$

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

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

$\frac{6}{5}$

.....

(2)

12. Simplify fully.

$$\frac{5a^3}{6y} \times \frac{4a^2y}{2ay} = \frac{20a^5y}{12ay^2}$$

$$= \frac{5a^4}{3y}$$

$\frac{5a^4}{3y}$

.....

(2)

13. Simplify fully.

$$\frac{c-2}{4} \times \frac{12}{2c-4}$$

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

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

$\frac{3}{2}$

.....

(2)

14. Simplify fully.

$$\frac{w}{2} \div \frac{w}{6}$$

$$\frac{w}{2} \times \frac{6}{w} = \frac{6w}{2w}$$

$$= 3$$

3

.....

(2)

15. Simplify fully.

$$\frac{v+3}{2} \div \frac{3v+9}{5}$$

$$\frac{v+3}{2} \times \frac{5}{3v+9}$$

$$\frac{v+3}{2} \times \frac{5}{3(v+3)} = \frac{5}{6}$$

$\frac{5}{6}$

.....

(2)

16. Simplify fully.

$$\frac{v+3}{15} \div \frac{v^2+3v}{25}$$

$\frac{v+3}{15} \times \frac{25}{v^2+3v}$

$\frac{v+3}{15} \times \frac{25}{v(v+3)} = \frac{25}{15v}$

$\frac{5}{3v}$

.....

(3)

17. Simplify

$$\frac{x^2+8x}{x^2+10x+16}$$

$\frac{x(x+8)}{(x+2)(x+8)}$

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

.....

(3)

18. Simplify

$$\frac{2(x+7)^4}{(x+7)^3}$$

$2(x+7)$

$2x+14$

.....

(1)

or $2(x+7)$

19. Simplify

$$\frac{x^2 - 3x + 2}{x^2 + 5x - 6}$$

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

$$\frac{x-2}{x+6}$$

.....

(3)

20. Simplify

$$\frac{x^2 - 4}{x^2 - 7x + 10}$$

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

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

.....

(3)

21. Simplify fully.

$$\frac{4x^2 - 25}{6x^2 - 11x - 10}$$

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

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

.....

(3)

22. Write as a single fraction in its simplest form.

$$\frac{w}{w+3} - \frac{5}{w(w+3)}$$

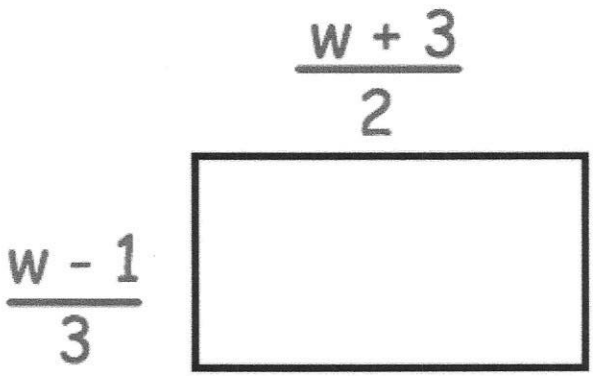
$\frac{w^2}{w(w+3)} - \frac{5}{w(w+3)}$

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

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

(3)

23. Write an expression for the area of the rectangle.



$\frac{w-1}{3} \times \frac{w+3}{2} = \frac{(w-1)(w+3)}{6}$

or

$\frac{w^2+2w-3}{6}$

(3)

24. Given

$$x = \frac{c}{3} \qquad y = \frac{ac}{4} \qquad z = \frac{a^2}{2c+1}$$

Find an expression for:

(a) x^2

$\frac{c}{3} \times \frac{c}{3} = \frac{c^2}{9}$

$\frac{c^2}{9}$

.....

(2)

(b) $x + y$ $\quad \frac{c}{3} + \frac{ac}{4}$

$\frac{4c}{12} + \frac{3ac}{12} = \frac{4c+3ac}{12}$ $\quad \frac{c(4+3a)}{12}$

.....

(2)

(c) $\frac{xy}{z}$ $\quad \frac{c}{3} \times \frac{ac}{4} = \frac{ac^2}{12}$

$\frac{ac^2}{12} \div \frac{a^2}{2c+1}$

$\frac{ac^2}{12} \times \frac{2c+1}{a^2}$

$\frac{c^2(2c+1)}{12a}$ $\quad \frac{2c^3+c^2}{12a}$

or .....

(4)

$\frac{c^2(2c+1)}{12a}$

25. The length of the base of a triangle and its perpendicular height are:

base: $\frac{x+5}{10}$ cm height: $\frac{x-1}{4}$ cm

Find an expression for the area of the triangle.

Area $= \frac{1}{2}bh$

$\frac{1}{2} \times \frac{x+5}{10} \times \frac{x-1}{4}$

$= \frac{(x+5)(x-1)}{80}$

$\frac{(x+5)(x-1)}{80}$ .....cm²

(4)

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26. Simplify

$$\frac{y^2-6y}{8} * \frac{12}{y^2-4y-12}$$

$\frac{y(y-6)}{2\cancel{8}} \times \frac{\cancel{12}^{3}}{(y+2)(y-6)}$

$\frac{3y}{2(y+2)}$

$\frac{3y}{2y+4}$ .....

(3)

or $\frac{3y}{2(y+2)}$

27. Simplify fully.

$$\frac{x^2 - x}{9} \times \frac{3}{x^2 + 8x + 7}$$

$\frac{x(x-1)}{9} \times \frac{3}{(x+1)(x+7)}$

$\frac{3x(x-1)}{3 \times 3(x-1)(x+7)}$ $\quad \frac{x}{3(x+7)}$

$\frac{x}{3(x-7)}$ or $\frac{x}{3x+21}$

.....

(3)

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28. Simplify fully

$$\frac{1}{3w^2 + 5w - 12} \div \frac{1}{2w^2 + w - 15}$$

$\frac{1}{(3w-4)(w+3)} \div \frac{1}{(2w-5)(w+3)}$

$\frac{1}{(3w-4)(w+3)} \times \frac{(w+3)(2w-5)}{1}$

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

$\frac{2w-5}{3w-4}$

.....

(4)

29. Simplify fully $\dfrac{3}{x+2}+\dfrac{5-3x}{4}+x$

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

$\frac{12}{4(x+2)} + \frac{(5-3x)(x+2)}{4(x+2)} + \frac{4x(x+2)}{4(x+2)}$

$= \frac{12 + 10 - x - 3x^2 + 4x^2 + 8x}{4(x+2)}$

$= \frac{x^2 + 7x + 22}{4(x+2)}$

$\frac{x^2+7x+22}{4x+8}$

(4)

30. ~~Write~~ $(x^2+4x)\times\dfrac{x^2+2x-24}{x^2-16}$ ~~as a single fraction.~~

Simplify your answer.

$\frac{x(x+4)}{1} \times \frac{(x+6)(x-4)}{(x-4)(x+4)}$

$= x(x+6)$

$x(x+6)$

(4)

31. $4+\dfrac{2x-1}{x-1}-\dfrac{x+2}{x+1}$ can be written in the form $\dfrac{ax^2+b}{x^2-1}$

where a and b are integers.

Find the values of a and b.

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

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

$$\frac{4x^2-4+2x^2+x-1-x^2-x+2}{x^2-1}$$

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

$a=5 \quad b=-3$

(4)

32. Simplify fully

$$\frac{8x^2-2}{6x^2-29x+9} \times \left(\frac{1}{2x+1}+\frac{1}{x-2}\right)$$

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

$$\frac{2(2x-1)(2x+1)}{(3x-1)(2x-9)} \times \left(\frac{3x-1}{(x-2)(2x+1)}\right)$$

$$\frac{2(2x-1)}{(2x-9)(x-2)}$$

$$\frac{4x-2}{2x^2-13x+18}$$

.....

(6)