

## Level 3 Algebra - Algebraic Fractions

June 2013 - Question 7

Jan 2014 - Question 7

Jan 2015 - Question 6

June 2015 - Question 10

Jan 2016 - Question 1

June 2016 - Question 7

Jan 2017 - Question 3

June 2017 - Question 2

Jan 2018 - Question 5

June 2018 - Question 16

Jan 2019 - Question 5

June 2019 - Question 16

Jan 2020 - Question 7

Jan 2021 - Question 5

Jan 2022 - Question 1

Jan 2023 - Question 2

June 2023 - Question 6

Jan 2024 - Question 22

7 (a) Expand and simplify  $(x - 6)(2x + 1)$

.....  
(2)

(b) Simplify  $\frac{x^2 + 2x}{x^2 + 7x + 10}$

.....  
(2)

**(Total for Question 7 is 4 marks)**

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7 Simplify  $\frac{3}{2x} - \frac{9x}{6x^2 - 4x}$

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(Total for Question 7 is 3 marks)



6 (a) Expand and simplify  $(3x - 5)(x - 2)$

.....  
(2)

(b) Simplify  $\frac{6x - 10}{6x^2 - 22x + 20}$

.....  
(2)

**(Total for Question 6 is 4 marks)**

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(b) Use your graph to find an estimate for one of the solutions of  $x^3 - 3x - 1 = 0$

.....  
(2)

**(Total for Question 9 is 6 marks)**

**10** (a) Expand and simplify  $(2x - 3)(x + 4)$

.....  
(2)

(b) Simplify  $(x^{-3})^3$

.....  
(1)

(c) Simplify  $(4y^4)^{\frac{1}{2}}$

.....  
(1)

(d) Write  $\frac{x}{x-3} + \frac{x-2}{x+3}$  as a single fraction.

Give your answer in its simplest form.

.....  
(3)

**(Total for Question 10 is 7 marks)**



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 (a) Expand and simplify  $(p - 1)(p + 1)$

.....  
(1)

(b) Expand and simplify  $(2q - 1)^2$

.....  
(2)

$(5y^2)^{-3}$  can be written in the form  $ay^n$

(c) Find the value of  $a$  and the value of  $n$

$a =$  .....

$n =$  .....

(2)

(d) Simplify  $\sqrt{64z^4}$

.....  
(2)

(e) Simplify  $\frac{x^2 + 7x - 8}{(x + 8)^2}$

.....  
(2)

(Total for Question 1 is 9 marks)

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7 (a) Simplify  $e^2 \times e^{-3}$

.....  
(1)

(b) Simplify  $\left(\frac{2}{n^3}\right)^{-2}$

.....  
(2)

(c) Express  $\frac{2x}{x+3} + \frac{7}{x-3}$  as a single fraction.

Give your answer in its simplest form.

.....  
(3)

**(Total for Question 7 is 6 marks)**

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3 (a) Simplify  $m^{\frac{3}{4}} \times m^{\frac{1}{2}}$

.....  
(1)

(b) Simplify  $n^{-3} \div n^2$

.....  
(1)

$(4x^6)^{\frac{3}{2}}$  can be written in the form  $ax^n$

(c) Find the value of  $a$  and the value of  $n$

$a =$  .....

$n =$  .....

(2)

(d) Expand and simplify  $(1 - 4y)(5 - y)$

.....  
(2)

(e) Simplify  $\frac{u - 2}{u^2 - 4u + 4}$

.....  
(2)

(Total for Question 3 is 8 marks)



2 (a) Expand and simplify  $(2x - 3)(7x + 5)$

.....  
(2)

(b) Write  $\frac{x}{3x + 4} + \frac{x - 3}{2x - 1}$  as a single fraction.

Give your answer in its simplest form.

.....  
(3)

(Total for Question 2 is 5 marks)



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5 (i) Factorise  $x^2 - 49$

(ii) Simplify fully  $\frac{x-1}{x+7} \div \frac{x^2-x}{x^2-49}$

(Total for Question 5 is 4 marks)



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16 (a) Write  $\frac{8}{5x + 5y} - \frac{x}{x^2 - y^2}$  as a single fraction.

Give your answer in its simplest form.

.....  
(4)

The integer  $p$  is not a square number.

(b) Rationalise the denominator of  $\frac{3p - \sqrt{p}}{2\sqrt{p}}$

Give your answer in its simplest form.

.....  
(3)

(Total for Question 16 is 7 marks)



5 (a) Simplify  $(16p^{-2})^{\frac{1}{4}}$

.....  
(2)

(b) Simplify  $\frac{u^2}{m^{\frac{1}{2}}} \div \frac{u^{\frac{1}{2}}}{m^3}$

.....  
(2)

(c) Express  $\frac{x-1}{x+3} - \frac{x}{x-3}$  as a single fraction.  
Give your answer in its simplest form.

.....  
(3)

(Total for Question 5 is 7 marks)



16 Express  $\frac{x+3}{2x-3} + \frac{4-x}{2x+3}$  as a single fraction.

Give your answer in its simplest form.

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.....  
(Total for Question 16 is 3 marks)



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7 (a) Simplify  $(p^{-2})^{-4}$

.....  
(1)

(b) Simplify  $(16t^2)^{\frac{3}{2}}$

.....  
(2)

(c) Simplify fully  $\frac{x^2 - 9}{(x - 3)^2(x + 3)^2}$

.....  
(2)

(Total for Question 7 is 5 marks)



5 Write  $\frac{x+2}{x-3} + \frac{x-2}{x+3}$  as a single fraction.

Give your answer in its simplest form.

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.....  
(Total for Question 5 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

You must NOT use a calculator.

1 (a) Expand and simplify  $(2c - 3d)(2c + 3d)$

.....  
(2)

(b) Simplify  $(y^{-\frac{1}{2}})^{-6}$

.....  
(1)

(c) Simplify  $(4p^2 + 5p^2)^{\frac{3}{2}}$

.....  
(2)

(d) Express  $\frac{x}{x+2} - \frac{x^2}{(x+2)^2}$  as a single fraction in its simplest form.

.....  
(3)

(Total for Question 1 is 8 marks)

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2 (a) Factorise  $3a^2 - 6ac$

.....  
(1)

(b) Factorise  $12xy - 9y + 20x - 15$

.....  
(2)

(c) Factorise  $25e^2 - 36h^2$

.....  
(1)

(d) Simplify  $\frac{(w + 2)(3w - 6)}{(2w + 4)(w - 2)}$

.....  
(2)

(Total for Question 2 is 6 marks)



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6 Simplify fully  $\frac{x-3}{x^2-9} \div \frac{x^2+x-6}{(x+3)^2}$

.....  
(Total for Question 6 is 3 marks)



22 (a) Simplify  $\frac{x^2 - 3x}{x^2 - 5x + 6}$

.....  
(2)

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

.....  
(4)

(Total for Question 22 is 6 marks)

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TOTAL FOR PAPER IS 90 MARKS

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