2.1 Algebraic Fractions: Simplifying, Multiplying and Dividing: 1-hour Pack

AQA 8365 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Simplify fully $(x^2+8x+15)/(x^2+2x-15)$

(Total for Question 1 is 2 marks)

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2 Simplify each fraction fully, using difference of two squares where needed.

(a) Simplify fully $(x^2-49)/(x^2+4x-21)$ **(3)**

(b) Simplify fully $(9x^2-4)/(3x^2+4x-4)$ **(3)**

(Total for Question 2 is 6 marks)

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3 Simplify each product fully.

(a) Simplify fully $(4x/3y) \times (9y^3/8x^2)$ **(3)**

(b) Simplify fully $(10a^2/7b^3) \times (14b^5/25a^4)$ **(3)**

(Total for Question 3 is 6 marks)

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4 Simplify each quotient fully.

(a) Simplify fully $(6x^3/5y^2) / (9x/10y)$ **(3)**

(b) Simplify fully $(8a^4/3b) / (12a/9b^4)$ **(3)**

(Total for Question 4 is 6 marks)

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5 Simplify fully $(x^2-36)/(x^2+x-30)$

(Total for Question 5 is 2 marks)

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6 Simplify fully $(5x/4y) \times (8y^3/15x^2)$

(Total for Question 6 is 2 marks)

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7 Simplify fully $(9a^2/5b^3) / (3a/10b)$

(Total for Question 7 is 2 marks)

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8 Simplify fully $(x^2-49)/(x^2-4x-21)$

(Total for Question 8 is 2 marks)

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9 Simplify fully $(10-2x)/(x^2-25)$

(Total for Question 9 is 3 marks)

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10 Simplify fully $(2x^2-5x-3)/(x^2-9)$

(Total for Question 10 is 3 marks)

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11 Simplify fully $(8+2x-x^2)/(x^2-x-12)$

(Total for Question 11 is 4 marks)

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12 Simplify fully $(x^2+7x+12)/(x^2-16) \times (x^2-4x)/(x^2+x-6)$

(Total for Question 12 is 4 marks)

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13 Simplify fully $(2x^2-3x-2)/(x^2-4) \div (2x+1)/(x-2)$

(Total for Question 13 is 4 marks)

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14 Simplify fully $(20x^2 + 43x + 14) / (10x^2 - 11x - 6)$.

(Total for Question 14 is 3 marks)

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15 Simplify fully $(x^2 - 8x + 15)/(x + 1) \div ((x - 3)/(x^2 + 4x + 3))$.

(Total for Question 15 is 4 marks)

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Mark scheme · 2.1 Algebraic Fractions: Simplifying, Multiplying and Dividing: 1-hour Pack

Question 1

numerator factorised as (x+3)(x+5) and denominator as (x-3)(x+5)	M1
(x+3)/(x-3) cao	A1

Answer: (x+3)/(x-3)

Question 2

(a) numerator factorised as (x-7)(x+7)	M1
(a) denominator factorised as (x+7)(x-3)	M1
(a) (x-7)/(x-3) cao	A1

(a) Answer: (x-7)/(x-3)

(b) numerator factorised as (3x-2)(3x+2)	M1
(b) denominator factorised as (3x-2)(x+2)	M1
(b) (3x+2)/(x+2) cao	A1

(b) Answer: (3x+2)/(x+2)

Question 3

(a) multiplies numerators and denominators: $36xy^3/(24x^2y)$ oe	M1
(a) numeric coefficient simplified to 3/2 oe	M1
(a) $3y^2/(2x)$ cao	A1

(a) Answer: $3y^2/(2x)$

(b) multiplies numerators and denominators: $140a^2b^5/(175a^4b^3)$ oe	M1
(b) numeric coefficient simplified to 4/5 oe	M1
(b) $4b^2/(5a^2)$ cao	A1

(b) Answer: $4b^2/(5a^2)$

Question 4

(a) inverts second fraction and multiplies: $(6x^3/5y^2)(10y/9x)$ oe	M1
(a) numeric coefficient simplified to 4/3 oe	M1
(a) $4x^2/(3y)$ cao	A1

(a) Answer: $4x^2/(3y)$

(b) inverts second fraction and multiplies: $(8a^4/3b)(9b^4/12a)$ oe	M1
(b) numeric coefficient simplified to 2 oe	M1
(b) $2a^3b^3$ cao	A1

(b) Answer: $2a^3b^3$

Question 5

numerator factorised as (x-6)(x+6) and denominator as (x-5)(x+6)	M1
(x-6)/(x-5) cao	A1

Answer: (x-6)/(x-5)

Question 6

multiplies numerators and denominators: $40xy^3/(60x^2y)$ oe	M1
$2y^2/(3x)$ cao	A1

Answer: $2y^2/(3x)$

Question 7

inverts second fraction and multiplies: $(9a^2/5b^3)(10b/3a)$ oe	M1
$6a/b^2$ cao	A1

Answer: $6a/b^2$

Question 8

numerator factorised as (x-7)(x+7) and denominator as (x-7)(x+3)	M1
(x+7)/(x+3) cao	A1

Answer: (x+7)/(x+3)

Question 9

numerator factorised as -2(x-5)	M1
denominator factorised as (x-5)(x+5)	M1
-2/(x+5) oe cao	A1

Answer: -2/(x+5)

Question 10

numerator factorised as (2x+1)(x-3)	M1
denominator factorised as (x-3)(x+3)	M1
(2x+1)/(x+3) cao	A1

Answer: (2x+1)/(x+3)

Question 11

rewrites numerator as $-(x^2-2x-8)$	M1
factorises x^2-2x-8 as (x-4)(x+2) and x^2-x-12 as (x-4)(x+3)	M1
cancels (x-4) correctly, retaining the negative sign	M1
-(x+2)/(x+3) oe cao	A1

Answer: -(x+2)/(x+3)

Question 12

factorises $x^2+7x+12$ as (x+3)(x+4) and x^2-16 as (x-4)(x+4)	M1
factorises x^2-4x as x(x-4) and x^2+x-6 as (x+3)(x-2)	M1
cancels (x+3), (x+4) and (x-4) correctly	M1
x/(x-2) oe cao	A1

Answer: x/(x-2)

Question 13

inverts second fraction and factorises $2x^2-3x-2$ as (2x+1)(x-2)	M1
factorises x^2-4 as (x-2)(x+2)	M1
cancels (2x+1) and one factor of (x-2) correctly	M1
(x-2)/(x+2) oe cao	A1

Answer: (x-2)/(x+2)

Question 14

factorises numerator: (5x + 2)(4x + 7)	M1
factorises denominator: (5x + 2)(2x - 3)	M1
(4x + 7)/(2x - 3) oe cao	A1

Answer: (4x + 7)/(2x - 3)

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Question 15

inverts the second fraction and multiplies	**M1**
factorises both quadratics	**M1**
cancels common factors	**M1**
(x - 5)(x + 3) oe cao	**A1**

Answer: (x - 5)(x + 3)

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