ADA PINPOINT TOPIC PACKS

(1)Simplifying Algebraic Fractions (5 Qns)
(2)Harder Algebraic Fractions (4 Qns)
(3)Adding Algebraic Fractions (4 Qns)

50_to_100_Percent_Pinpoint_AI_Pack

Time Allocation = 54mins , Max = 48 Marks

Calculated Grade Boundaries:

Grade	Marks
5-	4
5	7
5+	10
6-	13
6	16
6+	20
7-	23
7	26
7+	29
8-	32
8	36
8+	39
9-	42
9	45
9+	48

Question 1 (AO1): 42% of students got this right (3 marks)

18. Write as a single fraction in its simplest form $\frac{2}{x-4} - \frac{1}{x+3}$

.....

(Total 3 marks)

Question 2 (AO1): 40% of students got this right (3 marks)

12. (a) Simplify fully $\dfrac{x^2+3x-4}{2x^2-5x+3}$

.....

(3)

Question 3 (AO1): 36% of students got this right (5 marks)

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

.....

(Total 5 marks)

Question 4 (AO1): (No Calc) 35% of students got this right (3 marks)

12. (b) Write $\frac{4}{x+2} + \frac{3}{x-2}$ as a single fraction in its simplest form.

.....

(3)

Question 5 (AO1): 30% of students got this right (3 marks)

14 (*a*) Simplify $\dfrac{x^2-16}{2x^2-5x-12}$

(3)

Question 6 (AO1): (No Calc) 23% of students got this right (3 marks)

17. (b) Show that $\frac{1}{2x^2+x-15} \div \frac{1}{3x^2+9x}$ simplifies to $\frac{ax}{bx+c}$ where a, b and c are integers.

(3)

(Total for Question 17 is 5 marks)

Question 7 (AO1): 21% of students got this right (4 marks)

20 Show that $\frac{3x+6}{x^2-3x-10} \div \frac{x+5}{x^3-25x}$ simplifies to ax where a is an integer.

Question 8 (AO1): 18% of students got this right (2 marks)

15 Show that $\frac{a}{b+1}-\frac{a}{(b+1)^2}$ can be written as $\frac{ab}{(b+1)^2}$

Question 9 (AO1): (No Calc) 14% of students got this right (3 marks)

17 (*b*) Simplify fully $\dfrac{3-4x-4x^2}{2x^2-7x+3}$

Question 10 (AO2): 13% of students got this right (4 marks)

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

(Total 4 marks)

Question 11 (AO3): 10% of students got this right (5 marks)

21 Given that

$$2x - 1 \ : \ x - 4 \ = \ 16x + 1 \ : \ 2x - 1$$

find the possible values of x.

Question 12 (AO3): 7% of students got this right (5 marks)

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

Given that $f(x) = 4$

(c) find the possible values of x.

Give your answer in the form $\frac{p \pm \sqrt{q}}{r}$, where p, q and r are positive integers.

.....

(5)

Question 13 (AO2): 5% of students got this right (5 marks)

24. Solve $\dfrac{5(2x+1)^2}{4x+5} = 5x - 1$

.....

(Total 5 marks)

Answers to Qn 1 (AO1): 42% of students got this right

Question		Working	Answer	Mark	Notes
18.	(c)	$\frac{2(x+3)-(x-4)}{(x-4)(x+3)}$ $= \frac{2x+6-x+4}{(x-4)(x+3)}$	$\frac{x+10}{(x-4)(x+3)}$	3	M1 for common denominator of $(x-4)(x+3)$ M1 for $\frac{2(x+3)}{(x-4)(x+3)} - \frac{(x-4)}{(x-4)(x+3)}$ $\frac{2(x+3)-(x-4)}{(x-4)(x+3)}$ oe condone missing brackets around $x-4$ A1 for $\frac{x+10}{(x-4)(x+3)}$ or $\frac{x+10}{x^2-x-12}$

Answers to Qn 2 (AO1): 40% of students got this right

12.	(a)	$\frac{(x+4)(x-1)}{(2x-3)(x-1)}$	$\frac{x+4}{2x-3}$	3	M1 for $(x + 4)(x - 1)$ M1 for $(2x - 3)(x - 1)$ A1 cao

Answers to Qn 3 (AO1): 36% of students got this right

	20.	$4(2x-1)+3(x+3)$ $=(x+3)(2x-1)$ $8x-4+3x+9$ $=2x^2-x+6x-3$ $2x^2-6x-8=0$ $2(x-4)(x+1)=0$	$x=-1, 4$	5	M1 multiplying both sides by a common denominator of $(x+3)(2x-1)$ (oe) or $\frac{4(2x-1)+3(x+3)}{(x+3)(2x-1)}$ (= 1) or better seen or multiplying all 3 terms by $(x+3)$ or by $(2x-1)$ M1 (indep) for $2x^2-x+6x-3$ oe seen or $8x-4+3x+9$ (oe) A1 for $2x^2-6x-8$ (oe) or x^2-3x-4 (= 0) M1 (dep on M2) for correct method to solve a 3 term quadratic A1 cao for both solutions

Answers to Qn 4 (AO1): (No Calc) 35% of students got this right

12.	(b)	$\frac{4(x-2)}{(x+2)(x-2)}+\frac{3(x+2)}{(x+2)(x-2)}$	$\frac{7x-2}{(x+2)(x-2)}$	3	M1 for denominator $(x + 2)(x - 2)$ (or equivalent) **or** $x^2 - 4$ M1 for $\frac{4(x-2)}{(x+2)(x-2)}$ (or equivalent) **or** $\frac{3(x+2)}{(x+2)(x-2)}$ (or equivalent) (NB. The denominator must be $(x + 2)(x - 2)$ **or** $x^2 - 4$ **or** another suitable common denominator) A1 for $\frac{7x-2}{(x+2)(x-2)}$ **or** $\frac{7x-2}{x^2-4}$ SC: If no marks awarded then award B1 for $\frac{4(x-2)}{x^2-2}+\frac{3(x+2)}{x^2-2}$ (or equivalent)

Answers to Qn 5 (AO1): 30% of students got this right

Question 14 (Total 6 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$2x^2 - 5x - 12 = (2x + 3)(x - 4)$	M1	This mark is given for factorising the denominator
	$x^2 - 16 = (x + 4)(x - 4)$	M1	This mark is given for factorising the numerator
	$\frac{x+4}{2x+3}$	A1	This mark is given for the correct answer only

Answers to Qn 6 (AO1): (No Calc) 23% of students got this right

17	(b)		$\frac{3x}{2x-5}$	M1 M1 A1	factorise $2x^2+x-15$ [= $(2x-5)(x+3)$] or $3x^2+9x$ [= $3x(x+3)$] $\frac{1}{(2x-5)(x+3)} \times \frac{3x(x+3)}{1}$ cao

Answers to Qn 7 (AO1): 21% of students got this right

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
20		$3x$	M1 Factorising numerator and denominator of first fraction $\frac{3(x+2)}{(x-5)(x+2)}$ $\left(=\frac{3}{(x-5)}\right)$ M1 Factorising denominator of second fraction $\frac{x+5}{x(x+5)(x-5)}$ $\left(=\frac{1}{x(x-5)}\right)$ M1 Multiplication by reciprocal $\frac{3(x+2)}{(x-5)(x+2)} \times \frac{x(x+5)(x-5)}{(x+5)}$ A1 Completing algebra to reach $3x$

Answers to Qn 8 (AO1): 18% of students got this right

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
15		shown	C1 for $\frac{a(b+1)-a}{(b+1)^2}$ or $\frac{a(b+1)^2-a(b+1)}{(b+1)^3}$ oe C1 complete chain of reasoning

Answers to Qn 9 (AO1): (No Calc) 14% of students got this right

Question	Working	Answer	Mark	Notes
17 (b)		$\frac{3+2x}{3-x}$	M1	for $(3 + 2x)(1 - 2x)$ oe
			M1	for $(2x - 1)(x - 3)$ oe
			A1	for cancelling correctly to leave $\frac{3+2x}{3-x}$ oe

Answers to Qn 10 (AO2): 13% of students got this right

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

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

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

$$x^2 - x - 6 = 0$$

$$(x-3)(x+2) = 0$$

$x = 3$ or $x = -2$

Answers to Qn 11 (AO3): 10% of students got this right

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
21	$\frac{2x-1}{x-4} = \frac{16x+1}{2x-1}$ $(2x-1)^2 = (16x+1)(x-4)$ $12x^2 - 59x - 5 = 0$ $(12x+1)(x-5) = 0$	$-\frac{1}{12}$, 5	P1 for process to write as an equation P1 for process to clear the fractions P1 for process to write equation in form $ax^2 + bx + c = 0$ P1 for process to solve the equation A1 cao

Answers to Qn 12 (AO3): 7% of students got this right

21 (c)		$\frac{3 \pm \sqrt{101}}{4}$	M1	for representing the equation as a single fraction
			M1	for simplifying and rearranging to a quadratic equal to zero
			A1	for $4x^2 - 6x - 23 = 0$
			M1	for a complete method to solve their quadratic
			A1	oe

Answers to Qn 13 (AO2): 5% of students got this right

24. Solve $\dfrac{5(2x+1)^2}{4x+5} = 5x - 1$

$5(2x+1)^2 = (5x-1)(4x+5)$

$5(4x^2+4x+1) = 20x^2 + 21x - 5$

$20x^2 + 20x + 5 = 20x^2 + 21x - 5$

$20x + 5 = 21x - 5$

$x = 10$