ADA PINPOINT TOPIC PACKS

(1)Simultaneous Equations (8 Qns)
(2)Simultaneous Equations with a Quadratic (2 Qns)
(3)Solving Simultaneous Equations Graphically (2 Qns)

50_to_100_Percent_Pinpoint_AI_Pack

Time Allocation = 45mins , Max = 40 Marks

Calculated Grade Boundaries:

Grade	Marks
5-	3
5	6
5+	8
6-	11
6	14
6+	16
7-	19
7	22
7+	24
8-	27
8	30
8+	32
9-	35
9	38
9+	40

Question 1 (AO1): 50% of students got this right (3 marks)

2   Solve the simultaneous equations

$$3x + y = -4$$
$$3x - 4y = 6$$

(Total for Question 2 is 3 marks)

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Question 2 (AO2): (No Calc) 50% of students got this right (4 marks)

20.   Solve the simultaneous equations

$$5x + 2y = 11$$
$$4x - 3y = 18$$

$x =$ ....

$y =$ ....

(Total for Question 20 is 4 marks)

Question 3 (AO3): 48% of students got this right (4 marks)

15. A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30.
The total cost of 1 adult ticket and 3 child tickets is £22.

Work out the cost of an adult ticket and the cost of a child ticket.

adult ticket £...

child ticket £...

(Total for Question 15 is 4 marks)

Question 4 (AO2): (No Calc) 43% of students got this right (4 marks)

15. Solve the simultaneous equations

$$3x + 4y = 5$$
$$2x - 3y = 9$$

$x = $ ....

$y = $ ....

(Total for Question 15 is 4 marks)

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Question 5 (AO2): (No Calc) 34% of students got this right (3 marks)

18. Solve the simultaneous equations

$$4x + y = 25$$
$$x - 3y = 16$$

$x = $ ....

$y = $ ....

(Total for Question 18 is 3 marks)

Question 6 (AO2): (No Calc) 33% of students got this right (3 marks)

19. Solve the simultaneous equations

$$4x + y = 10$$
$$2x - 3y = 19$$

$x = $ ....

$y = $ ....

(Total 3 marks)

Question 7 (AO2): 32% of students got this right (4 marks)

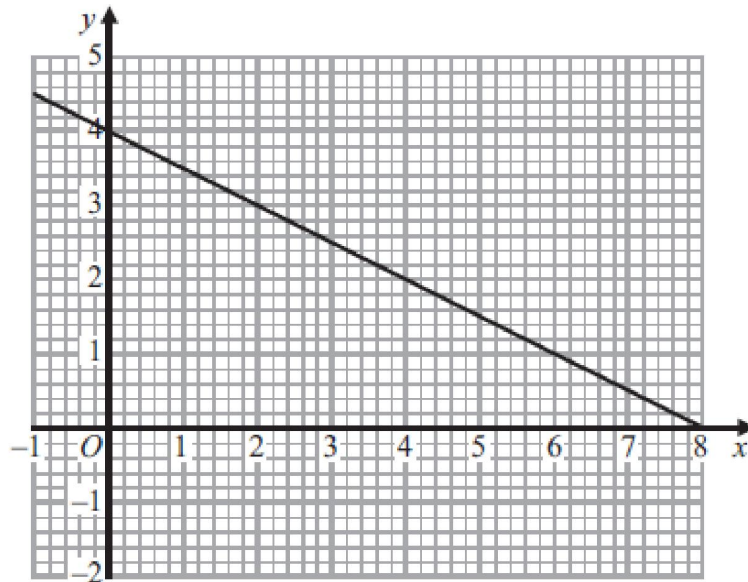18. Solve the equations

$$3x + 5y = 19$$
$$4x - 2y = -18$$

$x =$ ....

$y =$ ....

(Total 4 marks)

Question 8 (AO1): (No Calc) 28% of students got this right (1 marks)

13.

The graph of the straight line $x + 2y = 8$ is shown on the grid.

(a) On the grid, draw the graph of $y = \dfrac{x}{2} - 1$

RETEST QUESTION

(b) Use the graphs to find estimates for the solution of

$x + 2y = 8$

$y = \dfrac{x}{2} - 1$

$x = ...$ $y = ...$

(1)

(Total 4 marks)

Question 9 (AO3): (No Calc) 15% of students got this right (4 marks)

17   Solve

$$2x + 3y = \frac{2}{3}$$

$$3x - 4y = 18$$

$x = $ ....

$y = $ ....

(Total for Question 17 is 4 marks)

Question 10 (AO1): (No Calc) 11% of students got this right (5 marks)

20 Solve algebraically

$$x^2 + y^2 = 2$$

$$y - 2x = -1$$

....

(Total for Question 20 is 5 marks)

Question 11 (AO1): (No Calc) 11% of students got this right (5 marks)

20   Solve algebraically the simultaneous equations

$$x^2 + y^2 = 25$$
$$y - 3x = 13$$

....

(Total for Question 20 is 5 marks)

Answers to Qn 1 (AO1): 50% of students got this right

Question 2 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$3x - 3x = 0,\ y - -4y = 5y,\ 4 - 6 = -10$ $5y = -10$	M1	This mark is given for a method to eliminate one variable
	$y = -2$ $3x - 2 = -4$ or $3x + 8 = 6$	M1	This mark is given for substituting one found value in one of the equations
	$3x = -2$ $x = -\dfrac{2}{3},\ (y = -2)$	A1	This mark is given for a correct pair of answers only

Answers to Qn 2 (AO2): (No Calc) 50% of students got this right

20   Solve the simultaneous equations

$$5x + 2y = 11 \quad ①$$
$$4x - 3y = 18 \quad ②$$

$$15x + 6y = 33 \quad ① \times 3$$
$$8x - 6y = 36 \quad ② \times 2$$

$$\begin{array}{c} ① \\ + \\ ② \end{array} \downarrow$$

$$23x = 69$$
$$x = 3$$

Sub $x = 3$ into ①

$$5 \times 3 + 2y = 11$$
$$15 + 2y = 11$$
$$2y = -4$$
$$y = -2$$

3

Answers to Qn 3 (AO3): 48% of students got this right

15 A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30
The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.

$$3a + c = 30 \quad \times 3$$
$$a + 3c = 22 \quad \times 1$$

$$9a + 3c = 90$$
$$a + 3c = 22$$
$$8a \quad = 68$$
$$a = 8.5 \quad (£8.50)$$

$$8.5 + 3c = 22$$
$$3c = 13.5$$
$$c = 4.5 \quad (£4.50)$$

Answers to Qn 4 (AO2): (No Calc) 43% of students got this right

15 Solve the simultaneous equations

$$3x + 4y = 5 \quad \times 2$$
$$2x - 3y = 9 \quad \times 3$$

$$(1) \quad 6x + 8y = 10$$
$$(2) \quad 6x - 9y = 27$$

$$(1) - (2)$$

$$0 + 17y = -17$$

$$17y = -17$$

$$y = -1$$

Sub in $y = -1$

$$2x - 3(-1) = 9$$
$$2x + 3 = 9$$
$$2x = 6$$
$$x = 3$$

Answers to Qn 5 (AO2): (No Calc) 34% of students got this right

18 Solve the simultaneous equations

① $4x + y = 25$
② $x - 3y = 16$

① × 3 : $12x + 3y = 75$

② : $x - 3y = 16$

① + ② : $13x = 91$

$x = 7$

sub into ① : $4 \times 7 + y = 25$

$28 + y = 25$

$y = -3$

$x = \underline{\quad 7 \quad}$

$y = \underline{\quad -3 \quad}$

Answers to Qn 6 (AO2): (No Calc) 33% of students got this right

19. Solve the simultaneous equations

$$4x + y = 10 \quad ①$$
$$2x - 3y = 19 \quad ②$$

$① \times 3 \Rightarrow 12x + 3y = 30$

$② \Rightarrow 2x - 3y = 19$ $+$

_____

$14x = 49$

$$x = \frac{49}{14} = \frac{7}{2} = 3.5$$

Sub into ①

$$4(3.5) + y = 10$$
$$14 + y = 10$$
$$-14 \qquad -14$$
$$y = -4$$

$x =$ .....3.5.....

$y =$ .....-4.....

Answers to Qn 7 (AO2): 32% of students got this right

18. Solve the equations

$$3x + 5y = 19$$
$$4x - 2y = -18$$

$(\times 4)$
$(\times 3)$

$12x + 20y = 76 \quad \ldots \quad ①$

$12x - 6y = -54 \quad \ldots \quad ②$

① − ②

$26y = 130$

$y = 5$

subs. $y = 5$ into $3x + 5y = 19$

$3x = 19 - 25$

$3x = -6$

$x = -2$

$x = \quad -2$

$y = \quad 5$

Answers to Qn 8 (AO1): (No Calc) 28% of students got this right

13.
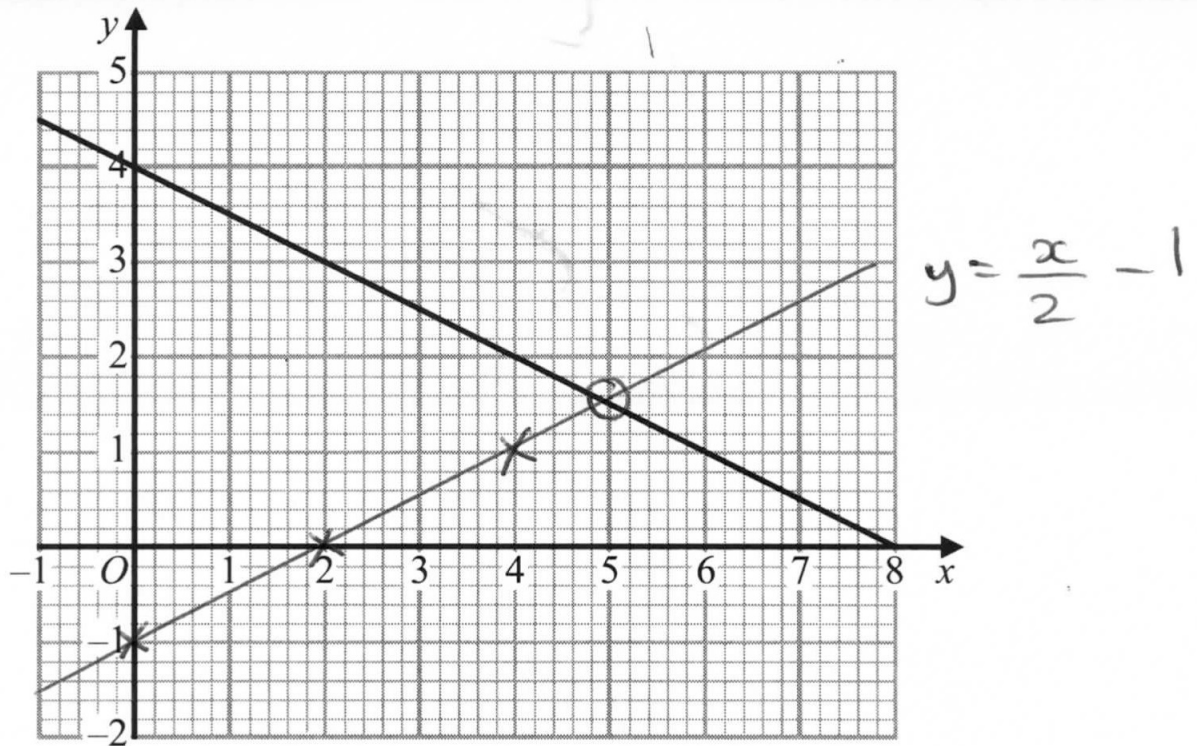
$$y = \frac{x}{2} - 1$$

The graph of the straight line $x + 2y = 8$ is shown on the grid.

(a) On the grid, draw the graph of $y = \frac{x}{2} - 1$

(3)

(b) Use the graphs to find estimates for the solution of

$$x + 2y = 8$$

$$y = \frac{x}{2} - 1$$

$x =$ ....5......... $y =$ ....1·6.......

(1)

Answers to Qn 9 (AO3): (No Calc) 15% of students got this right

| 17 | | | $x = 1\frac{3}{5}$ $y = 3\frac{1}{3}$ | 4 | M1 for a correct process to eliminate either variable (condone one arithmetic error) or to rearrange and substitute for elimination A1 cao for either x or y M1 (dep on M1) for correct substitution of found value into one of the equation or appropriate method after starting again (condone one arithmetic error) A1 cao |

Answers to Qn 10 (AO1): (No Calc) 11% of students got this right

20 Solve algebraically

$$x^2 + y^2 = 2 \quad \text{(1)}$$

$$y - 2x = -1 \quad y = 2x - 1 \quad \text{(2)}$$

Sub (2) into (1): $x^2 + (2x - 1)^2 = 2$

$$x^2 + 4x^2 - 4x + 2 = 2$$
$$5x^2 - 4x = 0$$
$$x(5x - 4) = 0$$

So $x = 0$ or $x = \frac{4}{5}$

And $y = -1$ or $y = 2 \times \frac{4}{5} - 1 = \frac{3}{5}$

....

(Total for Question 20 is 5 marks)

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Answers to Qn 11 (AO1): (No Calc) 11% of students got this right

Question 20 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$y - 3x = 13$, so $y = 3x + 13$ $x^2 + (3x + 13)^2 = 25$	M1	This mark is given for the substitution of $y = 3x + 13$ into $x^2 + y^2 = 25$
	$x^2 + 9x^2 + 39x + 39x + 169 = 25$	M1	This mark is given for the expansion of $x^2 + (3x + 13)^2 = 25$
	$10x^2 + 78x + 144 = 0$	M1	This mark is given for forming a quadratic equation equal to zero
	$2(5x^2 + 39x + 72) = 0$ $2(5x + 24)(x + 3) = 0$	M1	This mark is given for a method to solve the quadratic equation
	$x = -3, \quad y = 4$ $x = -\dfrac{24}{5}, \quad y = -\dfrac{7}{5}$	A1	This mark is given for a pair of correct solutions only