ADA PINPOINT TOPIC PACKS

(1)Inequalities and the Number Line (0 Qns)
(2)Inequalities (3 Qns)
(3)Quadratic inequalities (4 Qns)
(4)Inequalities Regions (7 Qns)

50_to_100_Percent_Pinpoint_AI_Pack

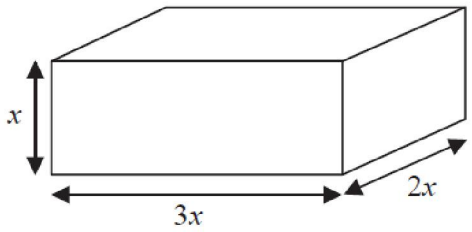
Time Allocation = 43mins , Max = 38 Marks

Calculated Grade Boundaries:

Grade	Marks
5-	3
5	6
5+	8
6-	11
6	13
6+	16
7-	18
7	21
7+	23
8-	26
8	28
8+	31
9-	33
9	36
9+	38

Question 1 (AO3): (No Calc) 46% of students got this right (3 marks)

9 Here is a cuboid.



All measurements are in centimetres.
x is an integer.
The total volume of the cuboid is less than 900 cm^3.

Show that $x \leq 5$.

Question 2 (AO1): 32% of students got this right (4 marks)

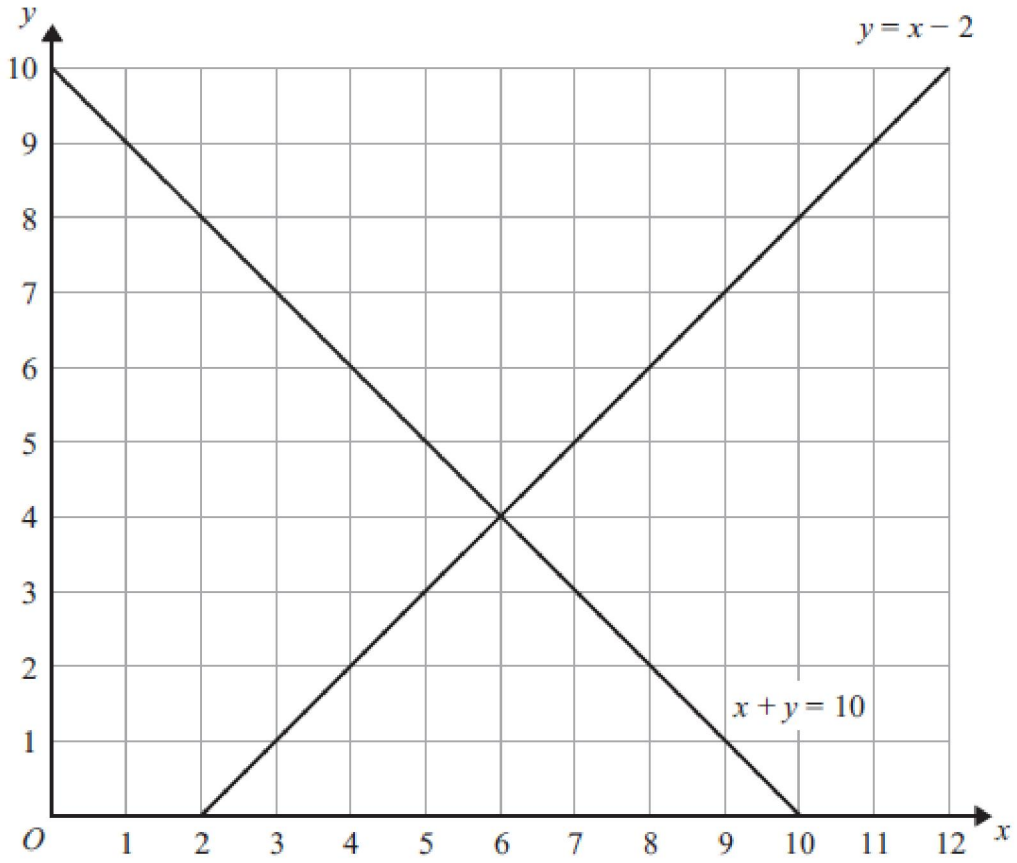
20. Solve the inequality $x(2x + 3) > 20$

.....

(Total 4 marks)

Question 3 (AO1): (No Calc) 32% of students got this right (3 marks)

11. The lines $y = x - 2$ and $x + y = 10$ are drawn on the grid.



On the grid, mark with a cross (×) each of the points with integer coordinates that are in the region defined by

$$y > x - 2$$

$$x + y < 10$$

$$x > 3$$

(Total 3 marks)

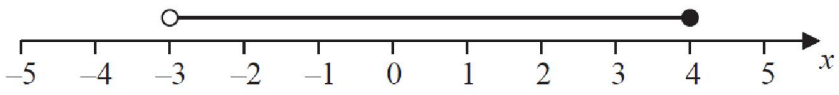
Question 4 (AO1): (No Calc) 32% of students got this right (4 marks)

5. (*a*) Solve the inequality $6y + 5 > 8$

.....

(2)

(*b*) Here is an inequality, in x, shown on a number line.



Write down the inequality.

.....

(2)

(Total for Question 5 is 4 marks)

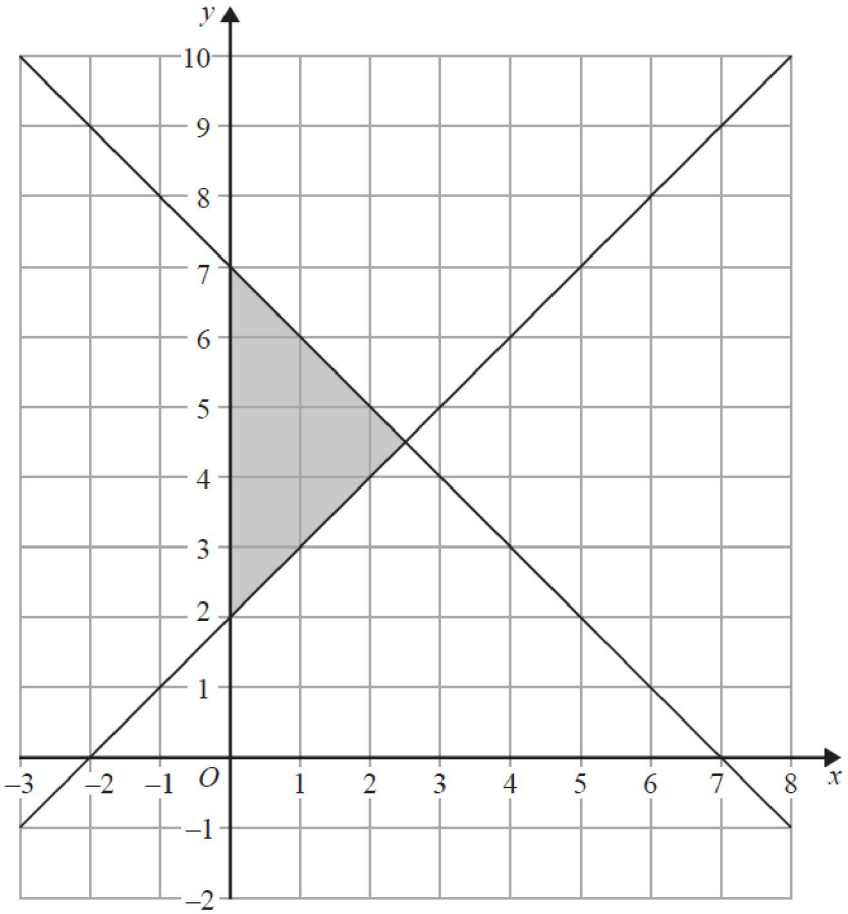
Question 5 (AO1): 25% of students got this right (2 marks)

16 For her maths homework, Farjana answered the following question.

Shade the region that is defined by all these inequalities.

$x + y \leq 7$ $y \geq 0$ $y \leq x + 3$

Here is Farjana's answer.



Farjana made some mistakes when she answered the question.

Write down two mistakes Farjana made.

1.....

2.....

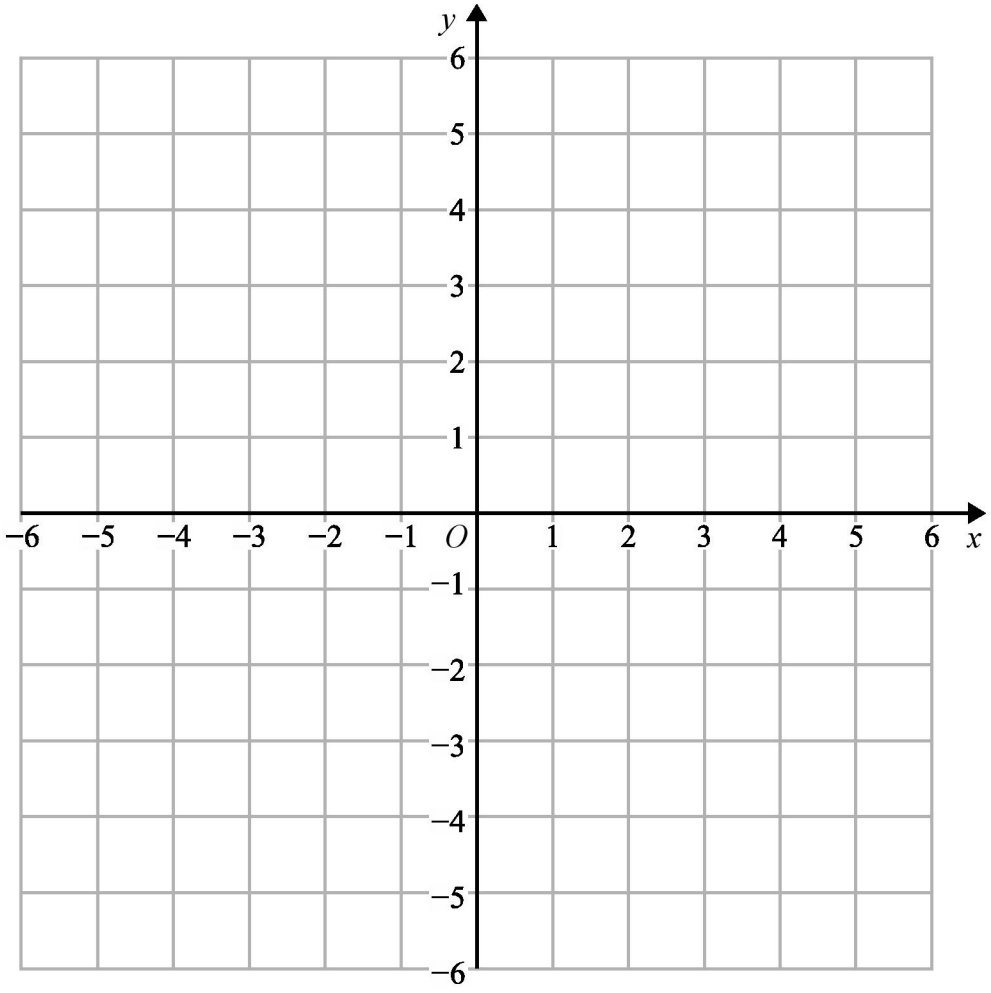
(Total for Question 16 is 2 marks)

Question 6 (AO1): 24% of students got this right (3 marks)

14 On the grid, shade the region that satisfies all these inequalities.

$y > 1$ $x + y < 5$ $y > 2x$

Labe the region **R**.



Question 7 (AO1): 22% of students got this right (3 marks)

19. Solve $2x^2 - 5x - 12 > 0$

.....

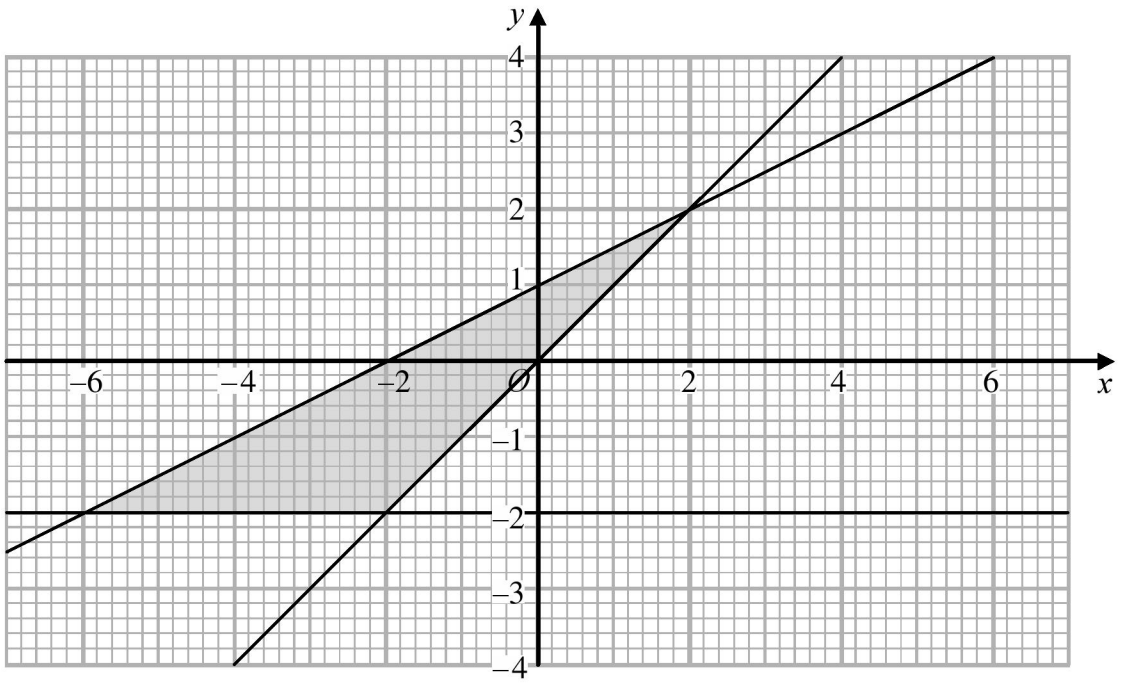
(Total for Question 19 is 3 marks)

Question 8 (AO1): (No Calc) 21% of students got this right (4 marks)

21 Solve the inequality $x^2 > 3(x + 6)$

Question 9 (AO2): 20% of students got this right (4 marks)

13



Write down the three inequalities that define the shaded region.

(Total for Question 13 is 4 marks)

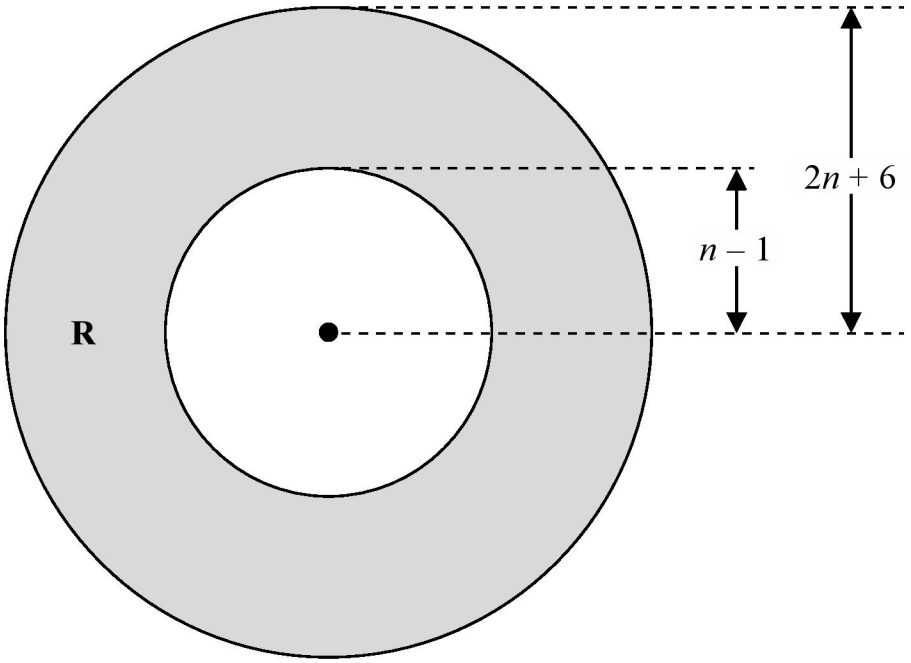
Question 10 (AO1): 19% of students got this right (3 marks)

19 Solve $2x^2 + 3x - 2 > 0$

(Total for Question 19 is 3 marks)

Question 11 (AO3): (No Calc) 13% of students got this right (5 marks)

12 The region **R**, shown shaded in the diagram, is the region between two circles with the same centre.



The outer circle has radius $(2n + 6)$

The inner circle has radius $(n - 1)$

All measurements are in centimetres.

The area of **R** is greater than the area of a circle of radius $(n + 13)$ cm.

n is an integer.

Find the least possible value of n.
You must show all of your working.

Answers to Qn 1 (AO3): (No Calc) 46% of students got this right

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
9	$x \times 2x \times 3x =$	Reasoning to reach $x \leq 5$	M1 Starts reasoning to find volume in terms of x M1 Gives inequality $6x^3 \leq 900$ or substitutes 5 and 6 into $6x^3$ M1 Completes reasoning to show $x \leq 5$

Answers to Qn 2 (AO1): 32% of students got this right

Question		Working	Answer	Mark	Notes
20.			$x < -4, \quad x > 2.5$	4	M1 for rearranging to give $2x^2 + 3x - 20 > 0$ M1 for method to solve $2x^2 + 3x - 20 = 0$ M1 for establishing critical values 2.5 and –4 A1 $x < -4, x > 2.5$

Answers to Qn 3 (AO1): (No Calc) 32% of students got this right

Question		Working	Answer	Mark	Notes
11.			(4,3), (4,4), (4,5), (5.4) marked	3	M2 for identifying the correct region or at least 3 correct points with no more than 3 incorrect points (M1 for drawing $x = 3$ (solid or dashed line) or at least 1 correct point with no more than 3 incorrect points) A1 cao

Answers to Qn 4 (AO1): (No Calc) 32% of students got this right

5 (a) Solve the inequality $6y + 5 > 8$

$-5 \quad -5$

$6y > 3$

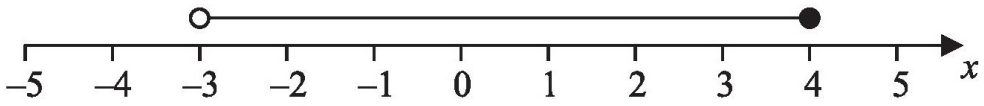
$y > 3/6$

$y > 1/2$

$y > 1/2$

(2)

(b) Here is an inequality, in x, shown on a number line.



Write down the inequality.

$-3 < x \leq 4$

(2)

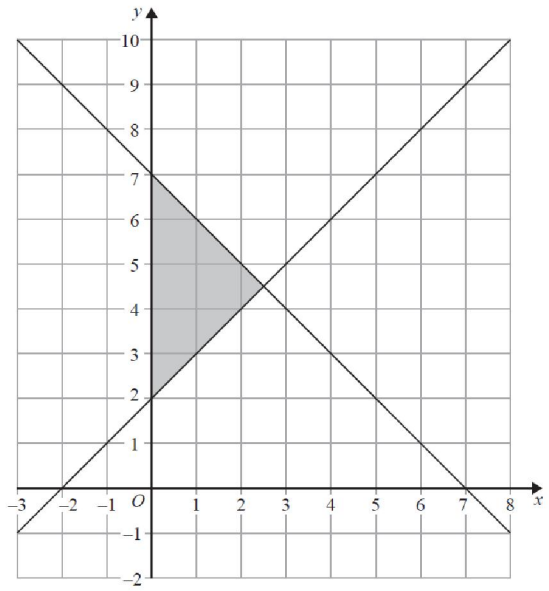
Answers to Qn 5 (AO1): 25% of students got this right

16 For her maths homework, Farjana answered the following question.

Shade the region that is defined by all these inequalities.

$x + y \leq 7$ $y \geq 0$ $y \leq x + 3$

Here is Farjana's answer.



Farjana made some mistakes when she answered the question.

Write down two mistakes Farjana made.

1 The intercept for line $y = x + 3$ is drawn in the wrong place

2 The region shaded doesn't satisfy $y \leq x + 3$ i.e. she has drawn for $y \geq x + 3$

(Total for Question 16 is 2 marks)

Answers to Qn 6 (AO1): 24% of students got this right

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
14		Region R shaded	M1	for two of the lines $y = 1$, $x + y = 5$, $y = 2x$ correctly drawn
			M1	for three lines correctly drawn
			A1	for fully correct region indicated with all lines correct

Answers to Qn 7 (AO1): 22% of students got this right

19		$x < \frac{-3}{2}$ $x > 4$	M1 A1 A1	for factorising, e.g. $(2x + 3)(x - 4)$ for critical values of $\frac{-3}{2}$ and 4 for correct inequalities

Answers to Qn 8 (AO1): (No Calc) 21% of students got this right

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
21		$x < -3$, $x > 6$	M1 Rearrange to $x^2 - 3x - 18 > 0$ M1 Correct method to solve $x^2 - 3x - 18 = 0$ M1 Establish critical values -3 and 6 A1 $x < -3$, $x > 6$

Answers to Qn 9 (AO2): 20% of students got this right

Question 13 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$y \geq -2, \quad y \leq -2 \quad \text{or} \quad y = -2$	M1	This mark is given for y and -2 indicated in an equality or inequality
	$y \geq x, \quad y \leq x \quad \text{or} \quad y = x,$	M1	This mark is given for y and x indicated in an equality or inequality
	$y \leq \frac{1}{2}x + 1, \quad y \geq \frac{1}{2}x + 1 \quad \text{or} \quad y = \frac{1}{2}x + 1,$	M1	$y = \frac{1}{2}x + 1$ indicated in an equality or inequality
	$y \geq -2, \quad y \geq x \quad \text{and} \quad y \leq \frac{1}{2}x + 1$	A1	This mark is given for three correct inequalities

Answers to Qn 10 (AO1): 19% of students got this right

Question 19 (Total 3 marks)

Part	Working an or answer examiner might expect to see	Mark	Notes
	$(2x - 1)(x + 2) > 0$	M1	This mark is given for a first step to solve the quadratic equation
	$x = -2, \quad x = \frac{1}{2}$	A1	This mark is given for the numbers -2 and $\frac{1}{2}$ seen
	$x < -2, \quad x > \frac{1}{2}$	A1	This mark is given for a correct answer only

Answers to Qn 11 (AO3): (No Calc) 13% of students got this right

Question	Working	Answer	Mark	Notes
12		9	P1	for process to find the area of a circle in algebraic form, e.g. $\pi(2n + 6)^2$ or $\pi(n - 1)^2$ or $\pi(n + 13)^2$ Condone omission of π or numerical value given throughout
			P1	for process to set up an inequality in n, e.g. $\pi(2n + 6)^2 - \pi(n - 1)^2 > \pi(n + 13)^2$
			P1	for process to remove all brackets, e.g. $4n^2 + 24n + 36 - n^2 + 2n - 1 > n^2 + 26n + 169$ oe
			P1	for isolating the n^2 term, e.g. reduction to $n^2 > 67$
			A1	cao