ADA PINPOINT TOPIC PACKS

(1)Solving Quadratics by Factorisation (3 Qns)
(2)Estimating Roots from Quadratic Graphs (3 Qns)
(3)Solving Quadratics Using the Formula (3 Qns)
(4)Harder Solving Quadratics with the Formula (2 Qns)
(5)Factorising Quadratics with a coefficient greater than

20_to_100_Percent_Pinpoint_AI_Pack

Time Allocation = 39mins , Max = 34 Marks

Calculated Grade Boundaries:

Grade	Marks
3+	2
4-	4
4	6
4+	8
5-	9
5	11
5+	13
6-	15
6	17
6+	18
7-	20
7	22
7+	24
8-	26
8	27

8+	29
9-	31
9	33
9+	34

Question 1 (AO1): 73% of students got this right (3 marks)

4.   (c)   Solve $x^2 - 3x - 10 = 0$

$x =$ ....

(3)

_____

Question 2 (AO1): (No Calc) 61% of students got this right (3 marks)

9. (b) Solve $x^2 - 3x - 40 = 0$

$x = $ ...., $x = $ ....

(3)

(Total 5 marks)

_____

Question 3 (AO2): 50% of students got this right (6 marks)

10.   The diagram shows a trapezium.
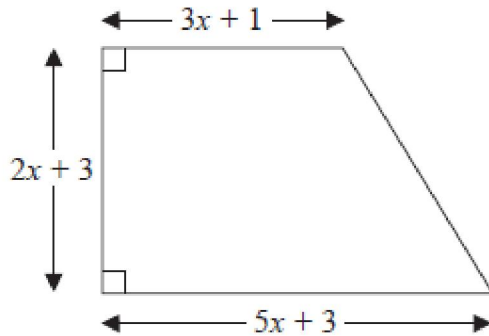
All the measurements are in centimetres.
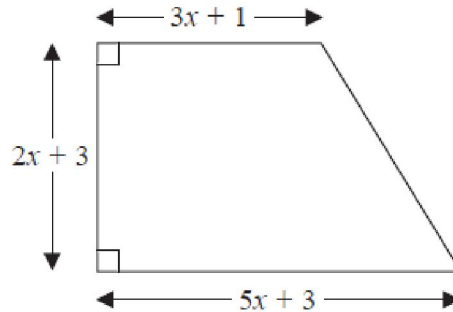The area of the trapezium is 46 cm^2.

(a)   Show that $x^2 + 2x - 5 = 0$

(3)

(b)   Solve the equation $x^2 + 2x - 5 = 0$
      Give your solutions correct to 2 decimal places.

....

(3)

(Total 6 marks)

Question 4 (AO1): 34% of students got this right (6 marks)

14.   The diagram shows a trapezium.

All the measurements are in centimetres.
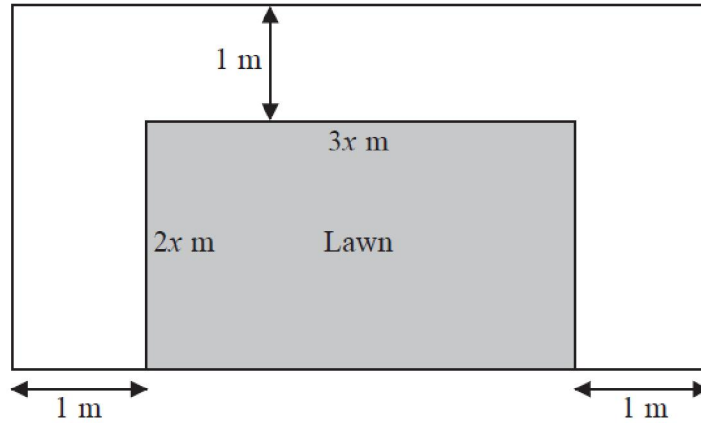The area of the trapezium is 46 cm^2.

(a) Show that $x^2 + 2x - 5 = 0$

(3)

(b) Solve the equation $x^2 + 2x - 5 = 0$
     Give your solutions correct to 2 decimal places.

(Total 6 marks)

Question 5 (AO2): 29% of students got this right (5 marks)

9. A rectangular lawn has a length of $3x$ metres and a width of $2x$ metres.
The lawn has a path of width 1 metre on three of its sides.

The total area of the lawn and the path is 100 m^2

(*b*) Calculate the area of the lawn.
Show clear algebraic working.

.... m^2

(5)

(Total 7 marks)

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Question 6 (AO3): 15% of students got this right (5 marks)
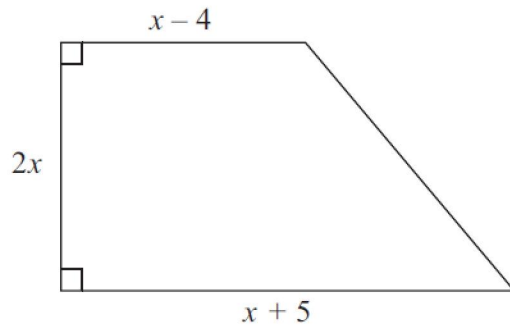
22. The diagram shows a trapezium.

Diagram **NOT** accurately drawn

All the measurements are in centimetres.

The area of the trapezium is 351 cm^2.

(a) Show that $2x^2 + x - 351 = 0$

(2)

(b) Work out the value of x.

....

(3)

(Total for Question 22 is 5 marks)

Question 7 (AO3): (No Calc) 8% of students got this right (6 marks)

21. The length of a rectangle is the same as the length of each side of a square.

The length of the rectangle is 4 cm more than 3 times the width of the rectangle.

The area of the square is 66 cm^2 more than the area of the rectangle.

Find the length and the width of the rectangle.
You must show all your working.

(Total for Question 21 is 6 marks)

Answers to Qn 1 (AO1): 73% of students got this right

4.	(c)	$(x-5)(x+2)=0$	5 and -2	3	M1 for $(x \pm 5)(x \pm 2)$
					A1 for $(x-5)(x+2)\ (=0)$
					B1 ft (dep on M1) for $x=5$ and -2

Answers to Qn 2 (AO1): (No Calc) 61% of students got this right

Question		Working	Answer	Mark	Notes
9	(b)	$(x-8)(x+5)$	8, –5	3	M2 for $(x-8)(x+5)$
					(M1 for $(x \pm 8)(x \pm 5)$
					A1 cao 8 and –5
		OR			**OR**
		$\dfrac{-(-3) \pm \sqrt{(-3)^2 - 4 \times 1 \times -40}}{2 \times 1}$			M1 for correct substitution in formula of $a = 1$, $b = \pm 3$ and $c = \pm 40$
					M1 for reduction to $\dfrac{3 \pm \sqrt{169}}{2}$
		$\dfrac{3 \pm \sqrt{169}}{2} = \dfrac{3 \pm 13}{2}$			A1 cao 8 and –5

Answers to Qn 3 (AO2): 50% of students got this right

10.	(a)	$\frac{1}{2}(3x + 1 + 5x + 3)(2x + 3) =$ $\frac{1}{2}(8x + 4)(2x + 3)$ So, $(4x + 2)(2x + 3) - 46 = 0$ $8x^2 + 16x + 6 - 46 = 0$ $8x^2 + 16x - 40 = 0$ $x^2 + 2x - 5 = 0$	Proof	3	M1 for correct method to find area of trapezium M1 (dep) for expanding all brackets to get a correct expression for the area C1 for complete correct proof
	(b)	$x = \dfrac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ $= \dfrac{-2 \pm \sqrt{24}}{2}$ **OR** $(x + 1)^2 - 1^2 - 5$ $= (x + 1)^2 - 6$ $x + 1 = \pm \sqrt{6}$	1.45, −3.45	3	M1 for $\dfrac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ condone one sign error in substitution M1 for $\dfrac{-2 \pm \sqrt{24}}{2}$ A1 for 1.44 to 1.45 (and −3.44 to −3.45) **OR** M1 for $(x + 1)^2 - 1^2 - 5$ (or equivalent) M1 for $x + 1 = (\pm)\sqrt{6}$ A1 for 1.44 to 1.45 (and −3.44 to −3.45)

Answers to Qn 4 (AO1): 34% of students got this right

14.	(a)	$\frac{1}{2}(3x + 1 + 5x + 3)(2x + 3) =$ $\frac{1}{2}(8x + 4)(2x + 3)$ So, $(4x + 2)(2x + 3) - 46 = 0$ $8x^2 + 16x + 6 - 46 = 0$ $8x^2 + 16x - 40 = 0$ $x^2 + 2x - 5 = 0$	Proof	3	M1 for correct method to find area of trapezium M1 (dep) for expanding all brackets to get a correct expression for the area C1 for complete correct proof
	(b)	$x = \dfrac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ $= \dfrac{-2 \pm \sqrt{24}}{2}$ **OR** $(x + 1)^2 - 1^2 - 5$ $= (x + 1)^2 - 6$ $x + 1 = \pm \sqrt{6}$	1.45, −3.45	3	M1 for $\dfrac{-2 \pm \sqrt{2^2 - 4(1)(-5)}}{2 \times 1}$ condone one sign error in substitution M1 for $\dfrac{-2 \pm \sqrt{24}}{2}$ A1 for 1.44 to 1.45 (and −3.44 to −3.45) **OR** M1 for $(x + 1)^2 - 1^2 - 5$ (or equivalent) M1 for $x + 1 = (\pm)\sqrt{6}$ A1 for 1.44 to 1.45 (and −3.44 to −3.45)

Answers to Qn 5 (AO2): 29% of students got this right

Question		Working	Answer	Mark	Notes
9.	(b)	$(3x + 14)(2x - 7)$ (= 0) $x = 3.5$ (Area =) 6 x "3.5"^{2} or (3 × "3.5") × (2 × "3.5")	73.5	5	M2 or $(x=)\dfrac{-7\pm\sqrt{49+2352}}{12}$ or $(x=)\dfrac{-7\pm\sqrt{2401}}{12}$ If not M2 then M1 for $(3x \pm14)(2x \pm 7)$ or $(x=)\dfrac{-7\pm\sqrt{7^2-4\times6\times-98}}{2\times6}$ condone + in place of ± and 1 sign error. A1 Dependent on at least M1 Ignore negative root. M1ft Dependent on at least M1 and x > 0 A1 cao Dependent on first M1

Answers to Qn 6 (AO3): 15% of students got this right
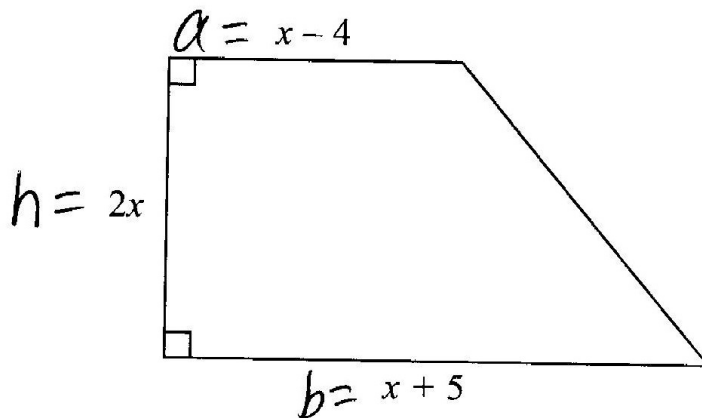
22 The diagram shows a trapezium.

$a = x-4$

Diagram **NOT** accurately drawn

$h = 2x$

$b = x+5$

All the measurements are in centimetres.

The area of the trapezium is 351 cm².

(a) Show that $2x^2 + x - 351 = 0$

$$A = \frac{1}{2}(a+b)h$$
$$= \frac{1}{2}(x-4+x+5) \times 2x$$
$$= (2x+1) \times x$$
$$= 2x^2 + x$$

$2x^2 + x = 351$

so

$2x^2 + x - 351 = 0$

(2)

(b) Work out the value of x.

$2x^2 + x - 351 = 0$

$2x^2 - 26x + 27x - 351 = 0$

$2x(x-13) + 27(x-13) = 0$

$(2x+27)(x-13) = 0$

$a \times c = -702$

Product -702
Sum $+1$

$[-26, 27]$

$x = 13$ $x = -\frac{27}{2}$ X can't be negative

$x = 13$

(Total for Question 22 is 5 marks)

Answers to Qn 7 (AO3): (No Calc) 8% of students got this right

21		width = $1\frac{2}{3}$ length = 9	P1	start to process e.g. establishes that $x^2 = xy + 66$
			P1	process to form equation in one variable, e.g. substitute in: e.g. $(3y + 4)^2 = y(3y + 4) + 66$ or $x^2 = 66 + (x(x - 4))/3$
			P1	process to arrive at equation to be solved $3y^2 + 10y - 25 = 0$ or $x^2 + 2x - 99 = 0$ oe
			P1	process to solve, e.g. $(3y - 5)(y + 5) = 0$ or $(x - 9)(x + 11) = 0$
			P1	selection of $y = 5/3$ or $x = 9$ as only solution, and subs to find other variable
			A1	y (width) $= 1\frac{2}{3}$ (cm) and x (length) $= 9$ (cm)