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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Mathematics, 2008

90800 Demonstrate an understanding of the features of graphs

Credits: Three
9.30 am Monday 24 November 2008

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

You should show ALL working.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Demonstrate an understanding of the features of graphs. ☐	Demonstrate an understanding of the relationship between functions and the features of their graphs. ☐	Determine and apply appropriate model(s) to solve graphical problem(s). ☐
Overall Level of Performance ☐		

You are advised to spend 25 minutes answering the questions in this booklet.

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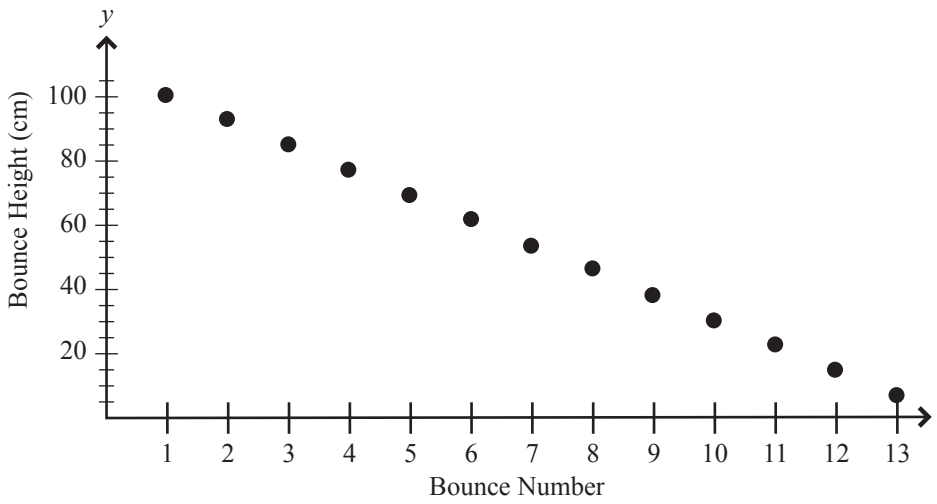
QUESTION ONE

As part of a mathematics experiment Bronwyn videos a bouncing ball.
She suspects that the height of each bounce is a constant amount less than the previous bounce.
Bronwyn measures the height of each bounce on her video.
The height of the first bounce = 100 cm, and the height of the second bounce = 92 cm.



(a) Bronwyn draws a line through all the points.

What does the value of the y-intercept mean in this situation?

(b) State the domain for which the above model is valid **and** describe how this is shown by the graph.

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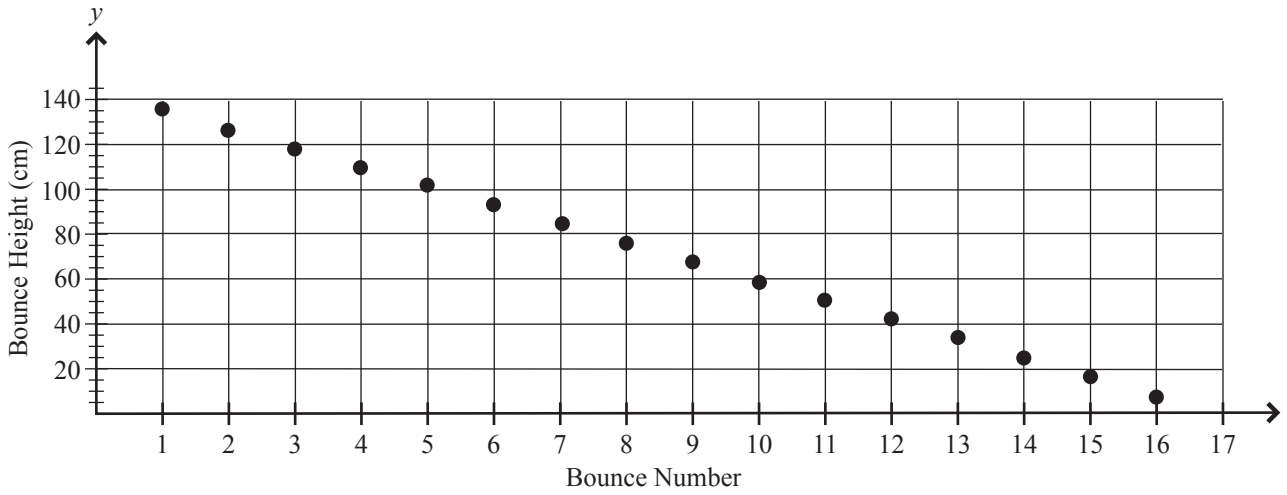
Bronwyn's classmate Brendan also videos a bouncing ball.
He claims that it is more bouncy than Bronwyn's.
The graph of bounce number vs. height for Brendan's ball is shown below.

Bounce number vs bounce height



(c) Is Brendan's claim correct or not? Explain how is this shown on the graph.

QUESTION TWO

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The centre of a circle is on the perpendicular bisector of any chord of the circle.

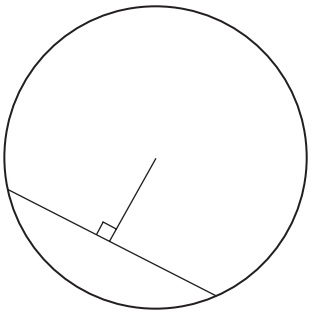

Diagram is NOT to scale

(a) The centre of a circle is the point (5,7).
The mid-point of a chord is (2,3).

Give the equation of the perpendicular bisector of the chord.

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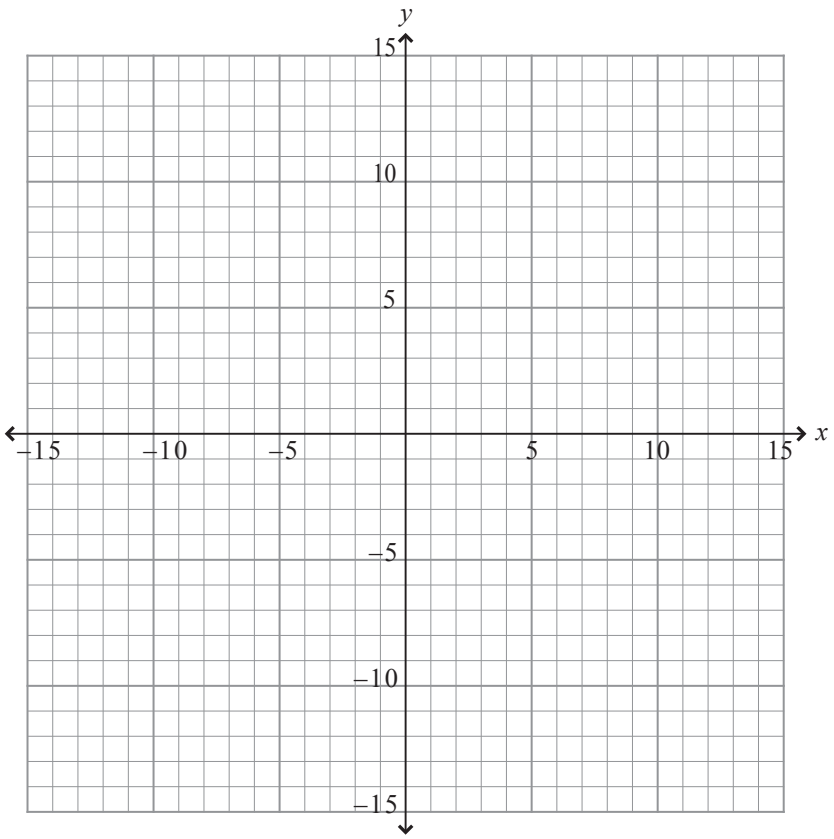
(b) Sketch the graph of the parabola whose turning point is (5,7), and that passes through the point (2,3).
Clearly show all its key features.

If you need to redraw this graph, use the grid on page 7.



(c) Give the equation of the function.

QUESTION THREE

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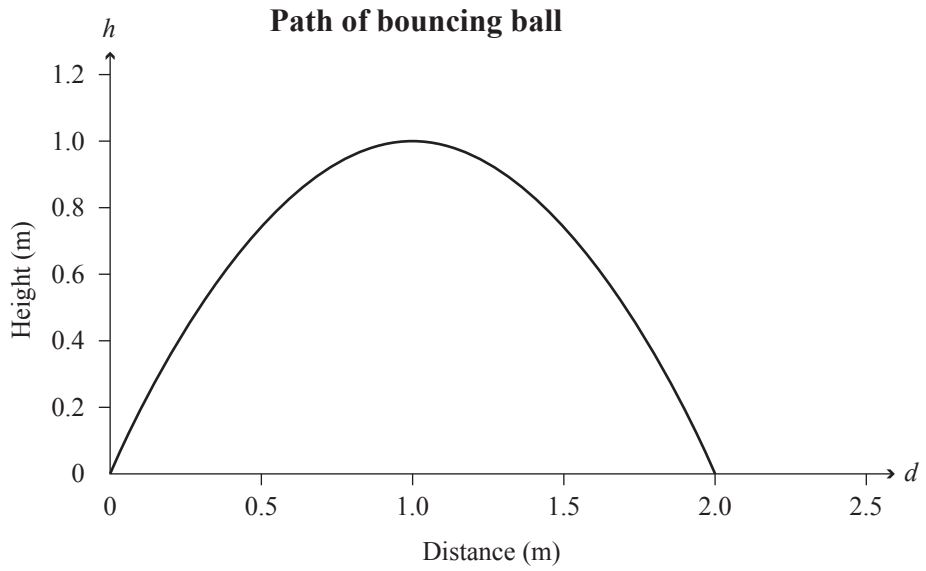
Bronwyn is watching the video of her bouncing ball.
She draws a parabola to show the path of the bouncing ball.
Bronwyn measures the height of the first bounce as 1 m and the distance between the starting points of the first and second bounces at exactly 2 m.
The graph of the first bounce of her ball is shown below.



(a) Write an equation that models the path of the first bounce of Bronwyn's ball.

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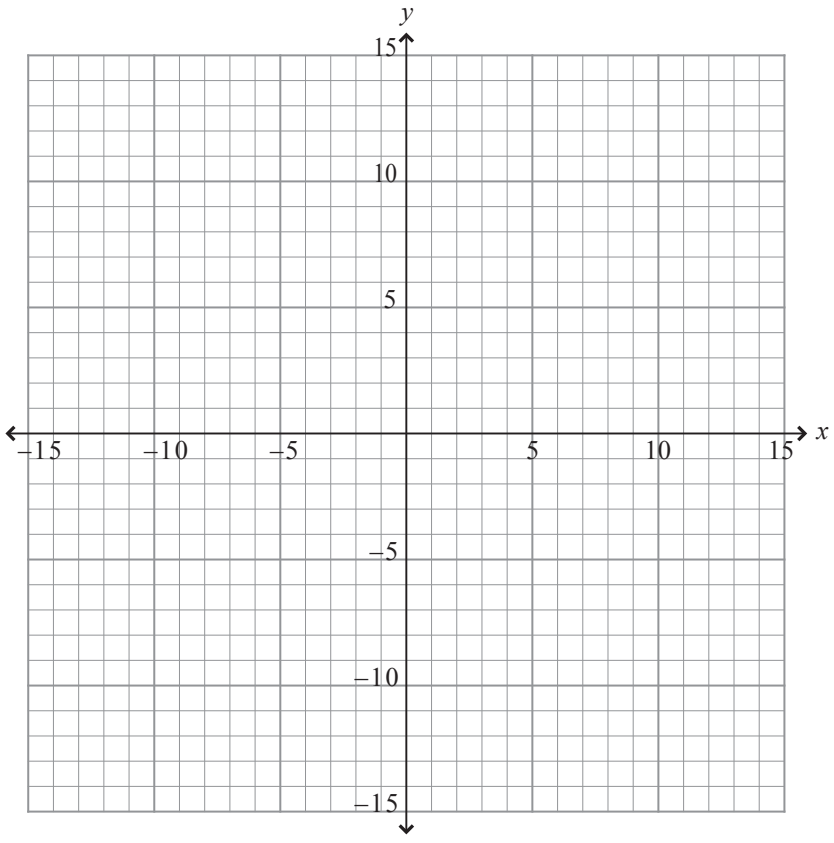
(b) The second bounce of Bronwyn's ball has the same shape as the model for the first bounce, but the vertex of the graph is translated down 20 cm and b units to the right.

Find the value of b.

If you need to redraw the graph from page 5, draw it on the grid below and carefully number the question. Make sure it is clear which graph from the question you want marked.

Question _____



Extra paper for continuation of answers if required.
Clearly number the question.

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Question number

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