

90148



901480



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA



For Supervisor's use only

# Level 1 Mathematics, 2009

## 90148 Sketch and interpret graphs

Credits: Three  
9.30 am Friday 20 November 2009

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.

The questions in this paper are NOT in order of difficulty. Attempt all questions or you may not provide enough evidence to achieve the required standard.

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

You should show ALL working.

Check that this booklet has pages 2–15 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
Sketch, and interpret features of, graphs.	<input type="checkbox"/>	Sketch, and interpret features of, graphs.	<input type="checkbox"/>
		Write equations for linear graphs.	<input type="checkbox"/>
Overall Level of Performance (all criteria within a column are met)			<input type="checkbox"/>

You are advised to spend 30 minutes answering the questions in this booklet.

Assessor's  
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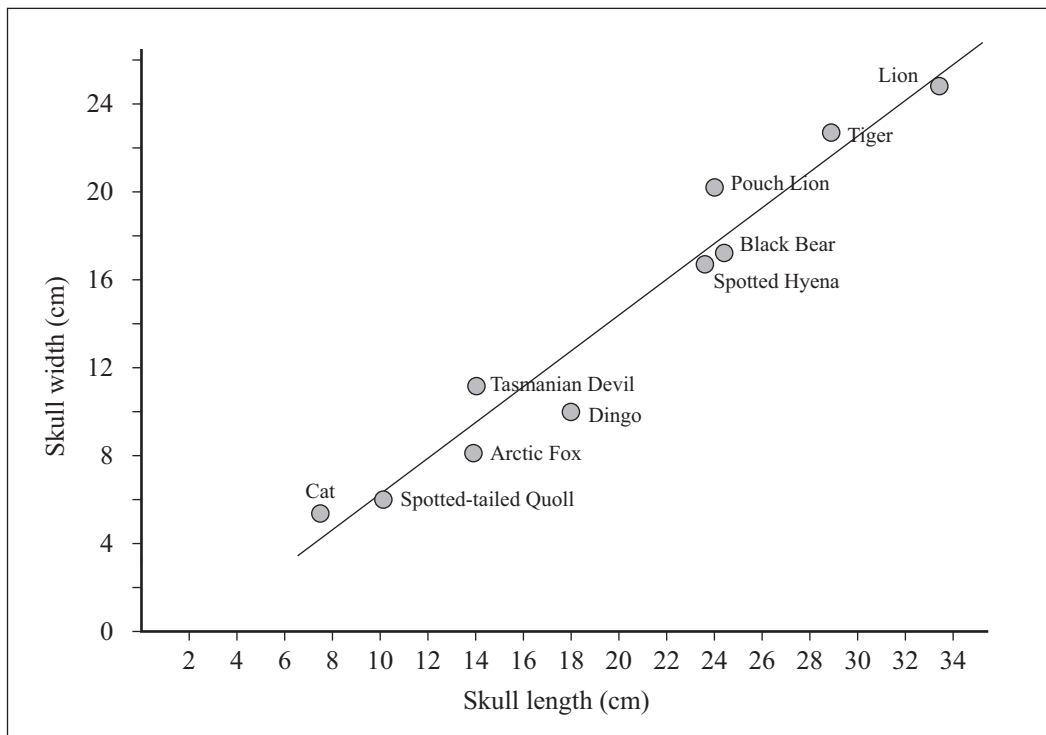
## QUESTION ONE

### (a) Skull of the extinct Australian Pouch Lion – a carnivorous animal



<http://en.wikipedia.org/wiki/File:Thylacoleo.jpg>

A scientist predicts that there is a linear relationship between a carnivore's skull width and its skull length. The relationship is shown on the graph below (all measurements are in centimetres).



- (i) Use the graph to give the names of THREE carnivorous animals with a skull width greater than expected for their skull length.

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- (ii) If the points on the graph for two carnivores are separate but can be joined by a vertical line, what can you say about their skull length **and** skull width?

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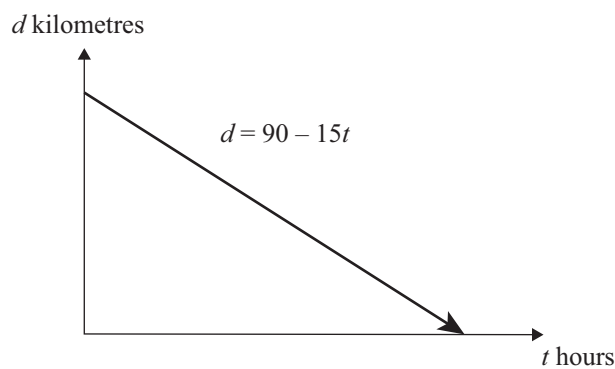
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- (b) Homing pigeons will fly home from wherever they are released.

The graph and equation below show one pigeon's distance from home ( $d$  kilometres),  $t$  hours after being released.



How long did the pigeon take to get home after being released?

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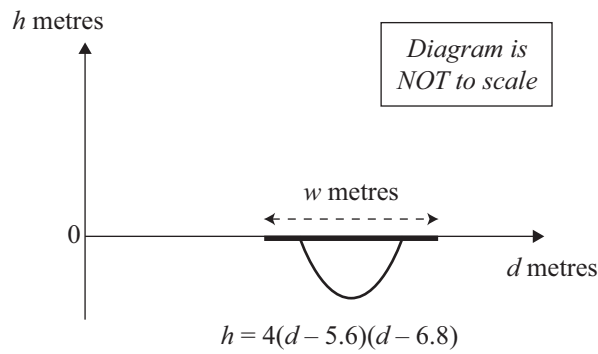


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- (c) A level path has a flat cover over the top of a parabola-shaped drain. The graph and function show the distance,  $d$  metres, from the edge of the path and the depth of the drain,  $h$  metres.



The cover on the drain is level with the path and extends 0.7 m each side of the drain.

What is the width,  $w$ , of the cover?

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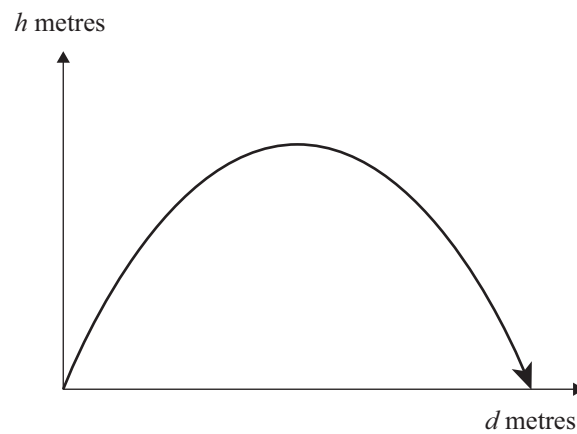


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- (d) An animal's jump can be modelled by a parabola, as shown in the diagram below, where  $h$  is the height of the jump in metres, and  $d$  is the horizontal distance along the ground in metres.



Find the equation for the parabola, which models a jump that goes a horizontal distance of 9 metres and reaches a maximum height of 2 metres.

[illegible]

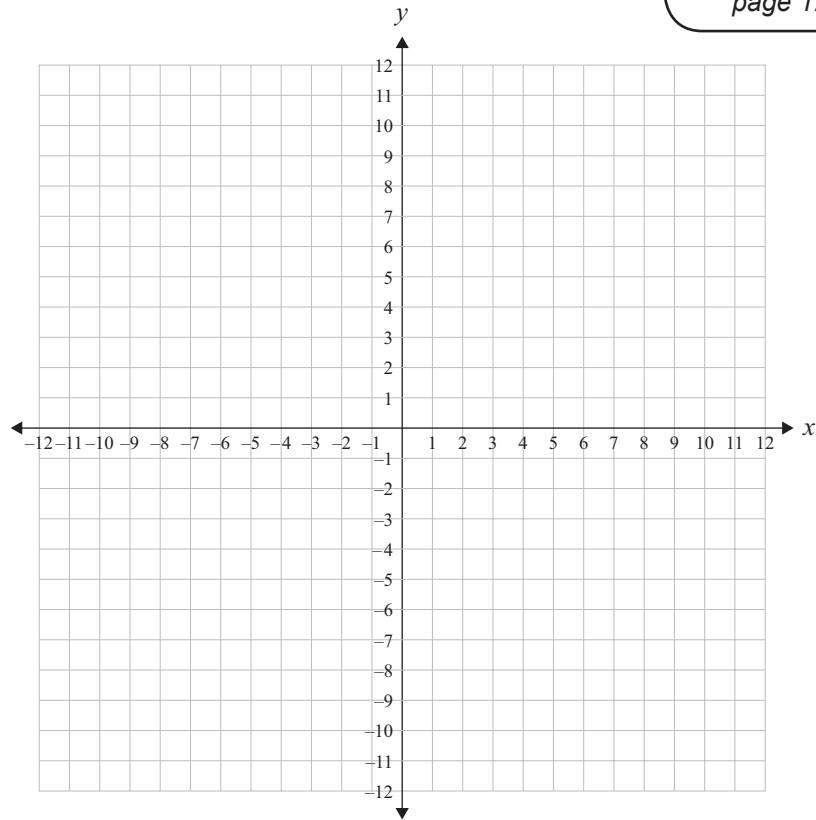
**QUESTION TWO**

Use the grids alongside to sketch the graphs of:

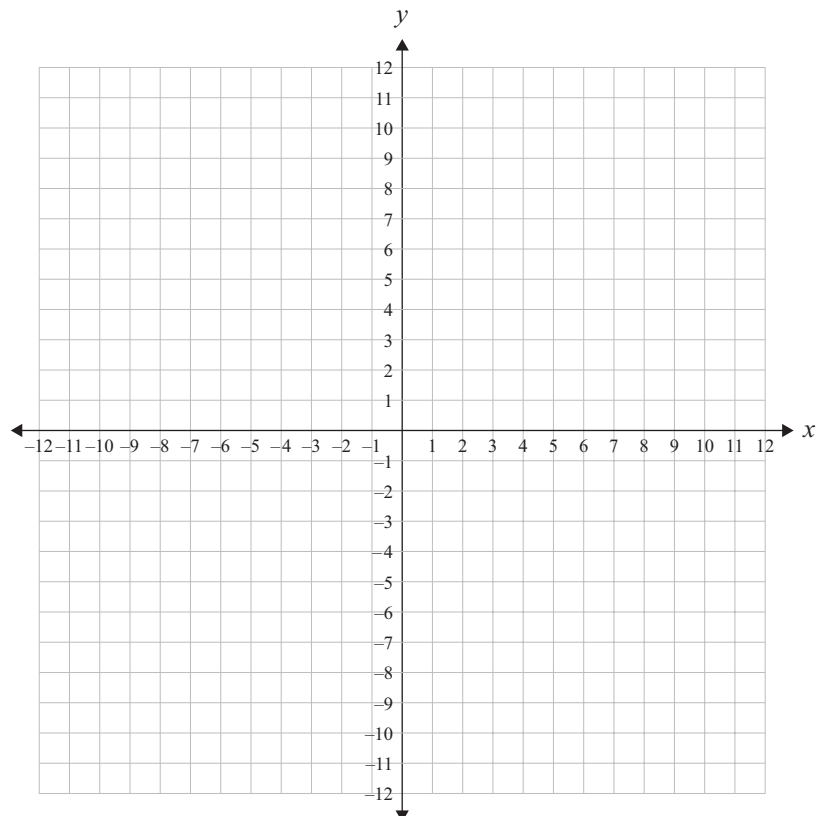
*If you need  
to redraw either  
of these graphs,  
use the grids on  
page 12.*

Assessor's  
use only

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



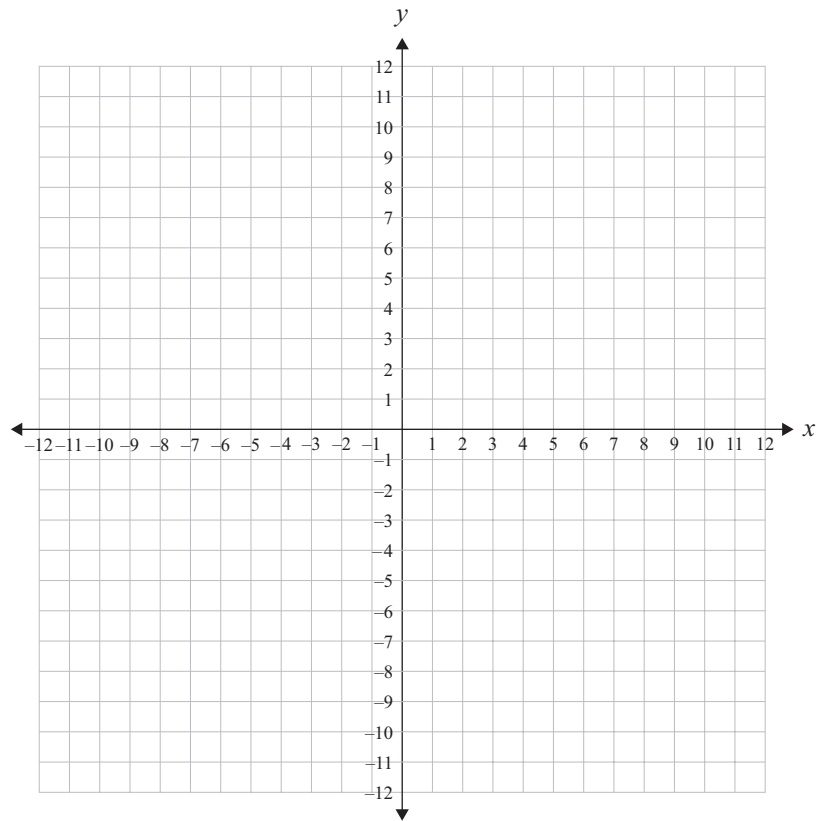
(b)  $y = x^2 - 1$



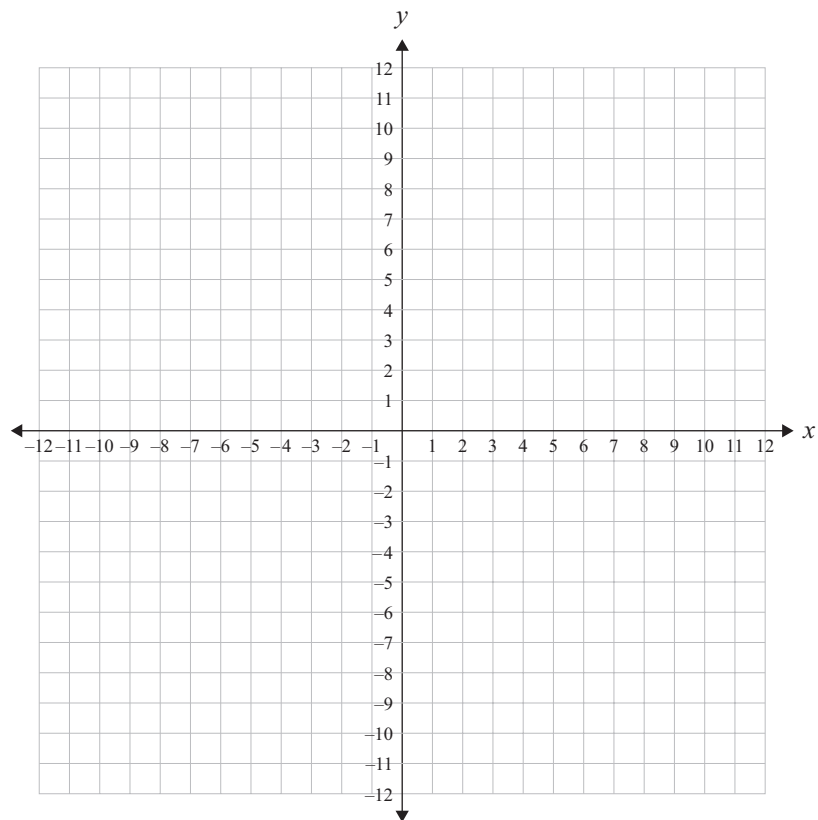
If you need  
to redraw either  
of these graphs,  
use the grids on  
page 13.

Assessor's  
use only

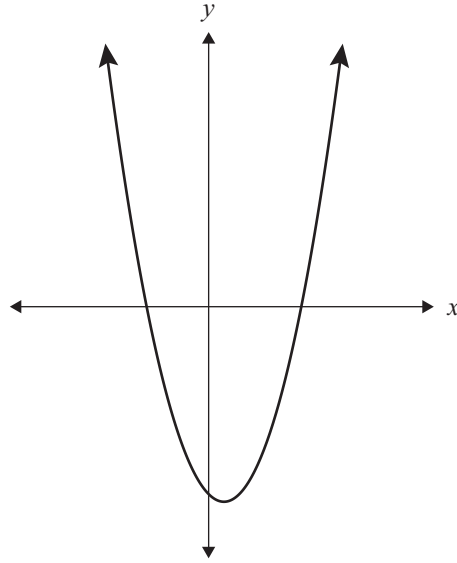
(c)  $3x + 2y = 18$



(d)  $y = 8 - 2x^2$



- (e) The equation for the parabola drawn on the graph below can be written as  $y = (x + 3)(x - 5)$ .



If this parabola is moved 3 units to the left and 20 units up, give the equation for the parabola in its **new** position AND give the coordinates of the  $y$ -intercept.

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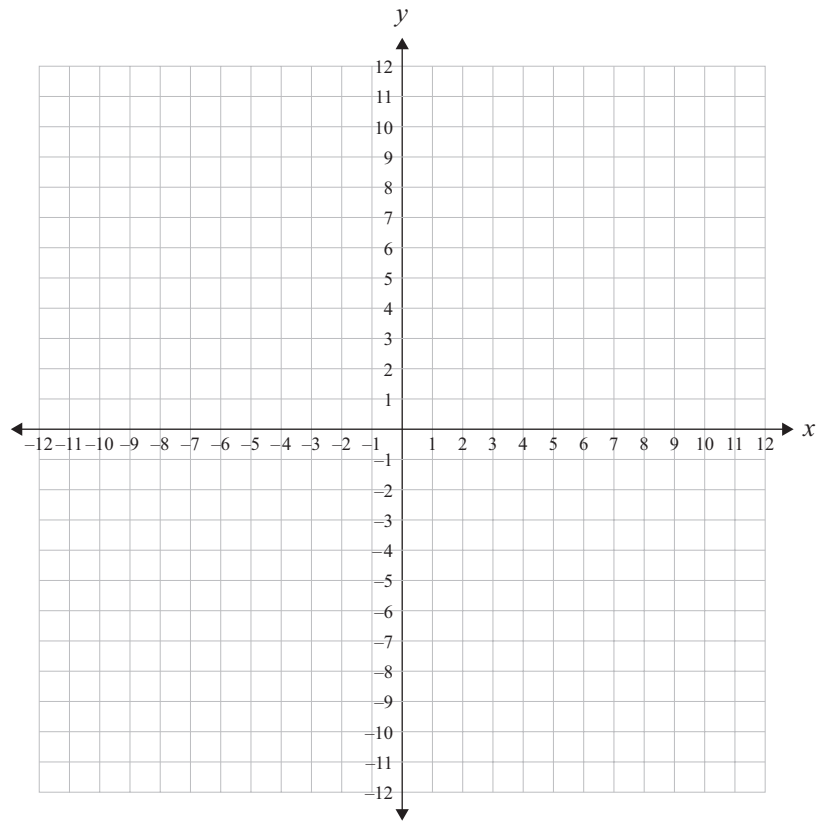
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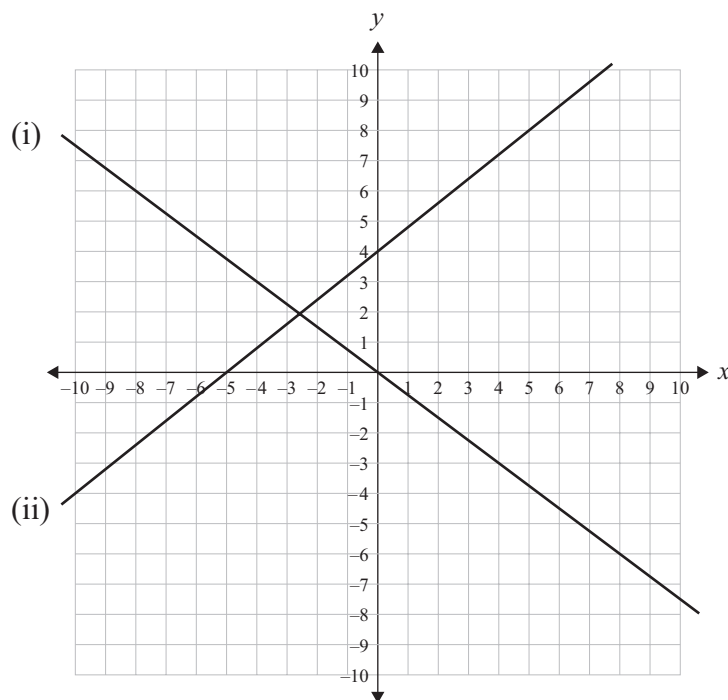
**QUESTION THREE**

- (a) On the grid, sketch the graph of  $x = 4$ .

*If you need  
to redraw this  
graph, use the  
grid on page 14.*



- (b) Write the equations of the lines drawn on the grid below.

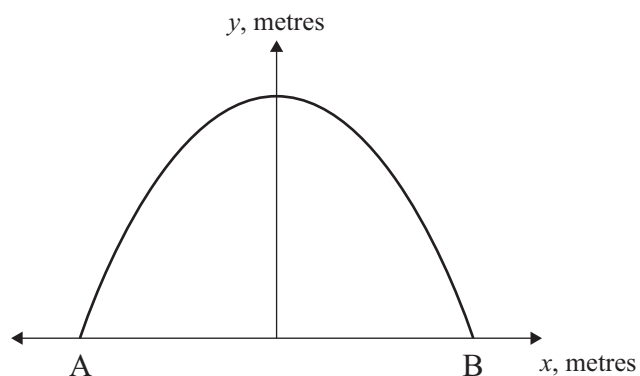


Equation of line (i) \_\_\_\_\_

Equation of line (ii) \_\_\_\_\_

- (c) Huia grows lettuces in a tunnel house.

The cross section of the tunnel house can be modelled by the parabola  $y = -x^2 + 1.69$  as shown on the diagram.



- (i) Find the width of the tunnel house, AB.

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- (ii) Huia grows tomatoes in a different tunnel house with a cross section modelled by the parabola, as shown below.

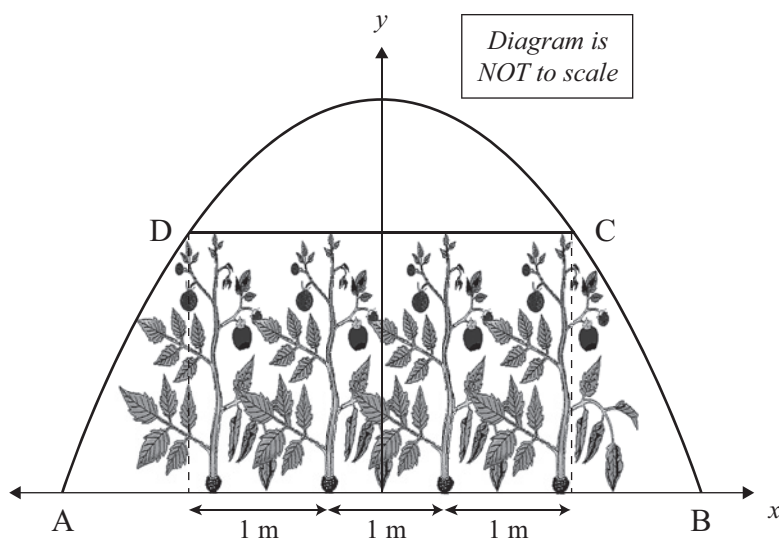
The tunnel house is 2 metres high and 4 metres wide.

The tomato plants are tied up to a horizontal rail, DC.

There are four rows of tomato plants across the tunnel house.

The rows are 1 metre apart.

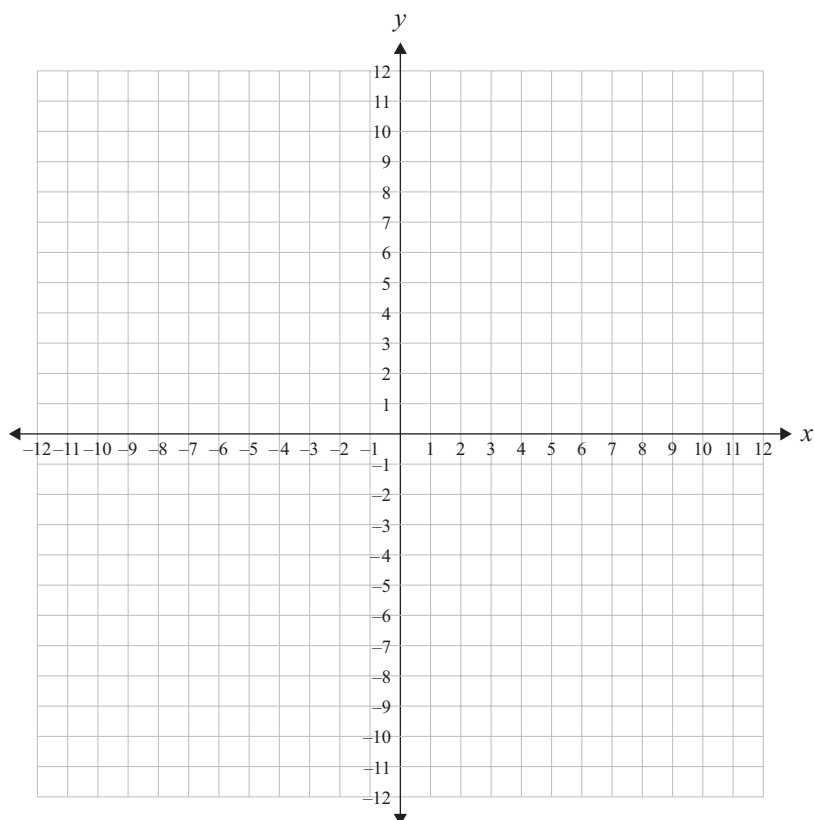
How high above the ground is the rail DC?



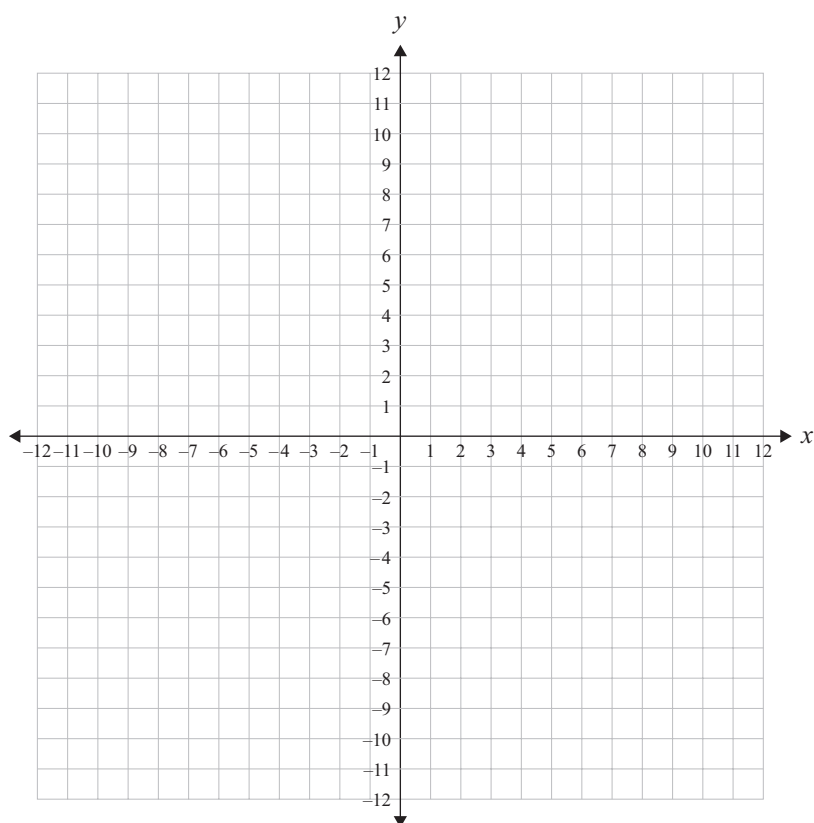
If you need to redraw a graph from page 6, draw it on a grid below and carefully number the question. Make sure it is clear which graph you want marked.

Assessor's  
use only

Question \_\_\_\_\_



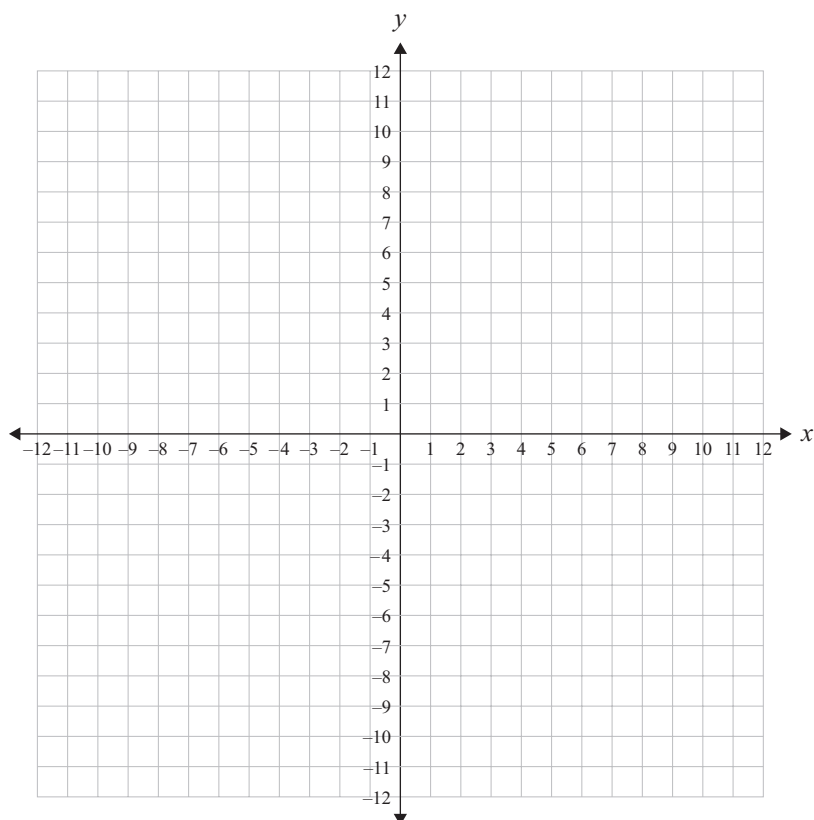
Question \_\_\_\_\_



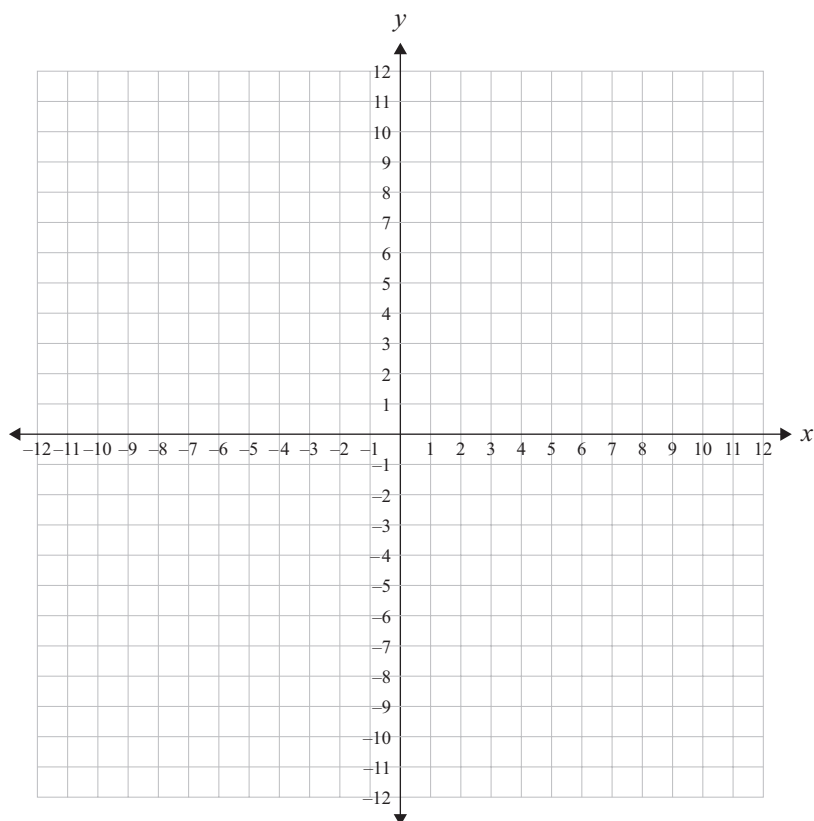
If you need to redraw a graph from page 7, draw it on a grid below and carefully number the question. Make sure it is clear which graph you want marked.

Assessor's  
use only

Question \_\_\_\_\_



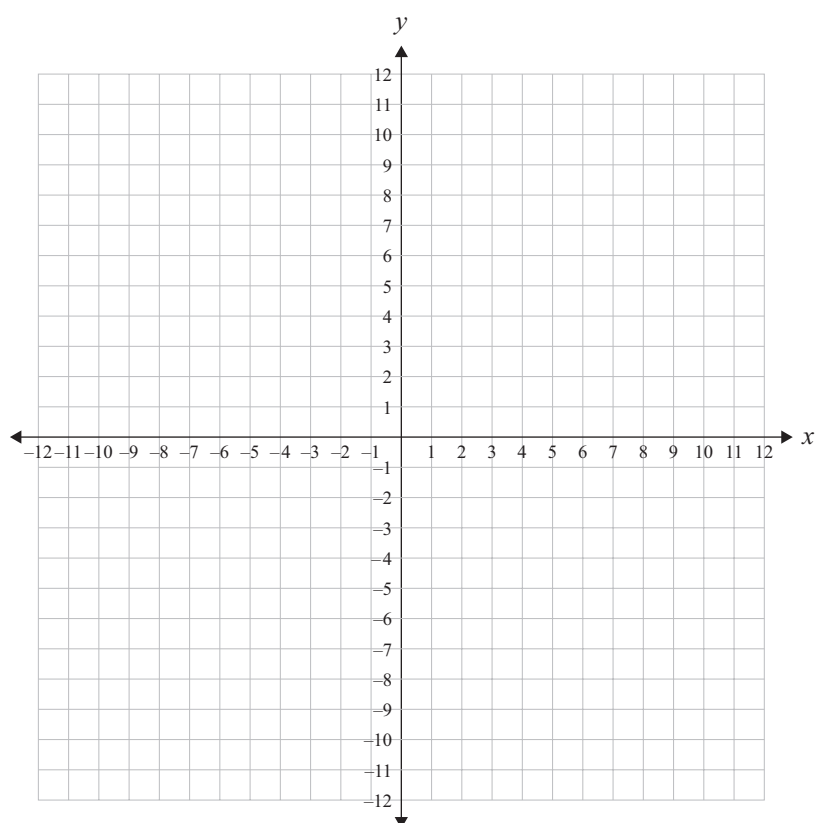
Question \_\_\_\_\_



If you need to redraw the graph from page 9, draw it on the grid below and carefully number the question. Make sure it is clear which graph you want marked.

Assessor's  
use only

Question \_\_\_\_\_



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

Assessor's  
use only

Question  
number

