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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY

MANA TOHU MĀTAURANGA O AOTEAROA

Level 2 Mathematics, 2007

90285 Draw straightforward non-linear graphs

Credits: Three

2:00 pm Thursday 29 November 2007

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

Make sure you have a copy of Formulae Sheet L2-MATHF.

You should answer ALL the questions in this booklet.

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 2–12 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**	
Draw straightforward non-linear graphs.	Draw non-linear graphs.	Determine and apply an appropriate model for a situation involving graphs.	
	Use non-linear graphs to solve problems.		
Overall Level of Performance (all criteria within a column are met)			

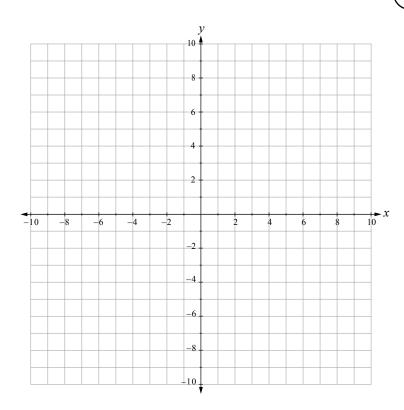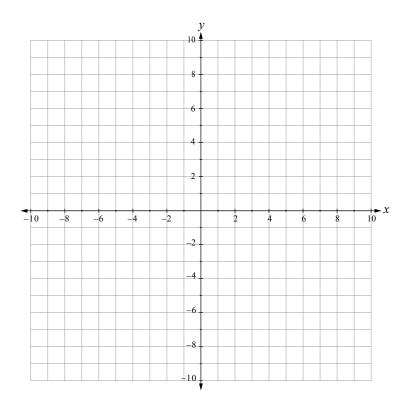You are advised to spend 35 minutes answering the questions in this booklet.

QUESTION ONE

Draw the following graphs, showing clearly any key features.

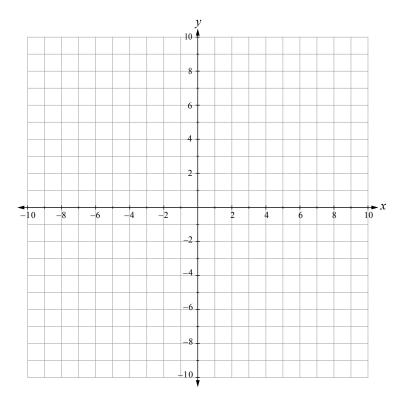*If you need to redraw either of these graphs, use the grids on page 8 and make sure it is clear which graph(s) you want marked.*

(a) $y = (x + 2)^2(x - 1)$
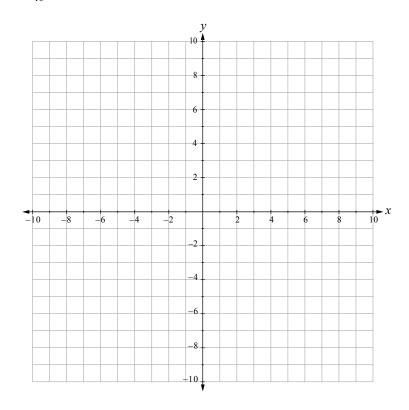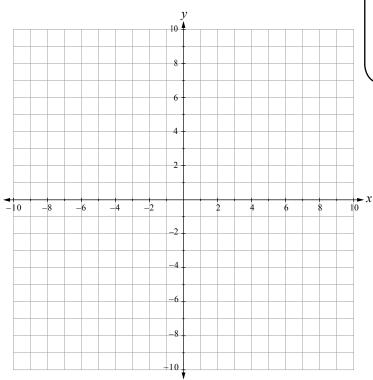

(b) $y = x^2 - x - 6$

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(c) $y = 3^{-x}$

(d) $y = 1 + \log_{10}x$

(e) $(x + 2)^2 + (y - 1)^2 = 16$

QUESTION TWO
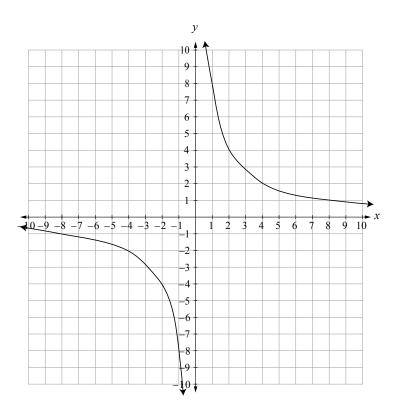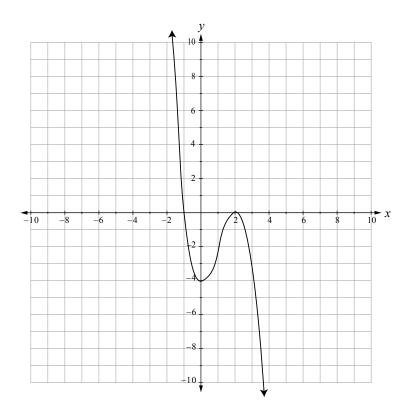
Write the equation for each of the following graphs.

(a)

Equation: _____

(b)
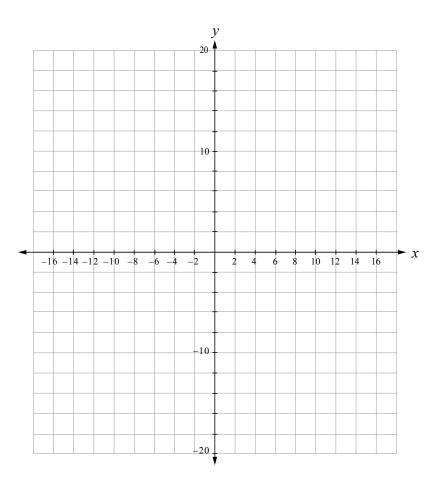
Equation: _____

QUESTION THREE

Assessor's use only

(a) Draw the complete graph of $y = 8 + \dfrac{10}{x - 0.25}$

(b) The cost C of producing a cheesecake can be modelled by the function

$$C = 8 + \dfrac{10}{n - 0.25}$$

where n is the number of cheesecakes produced.

Describe fully how the cost of producing each cheesecake changes as n increases.

_____

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QUESTION FOUR

A 16 cm diameter ring cake tin with curved sides is being designed.
The cross section of the new cake tin design is shown in the diagram below.
The cake tin is symmetrical about DH.
D is the midpoint of BF.
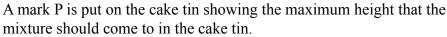The curved surfaces AB and FG may be modelled by two parts of a parabola.
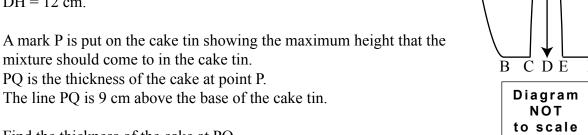The curved surface CHE may be modelled by a second parabola.
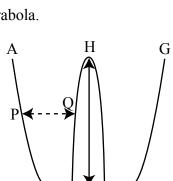AG = 16 cm, and H is the midpoint of AG.

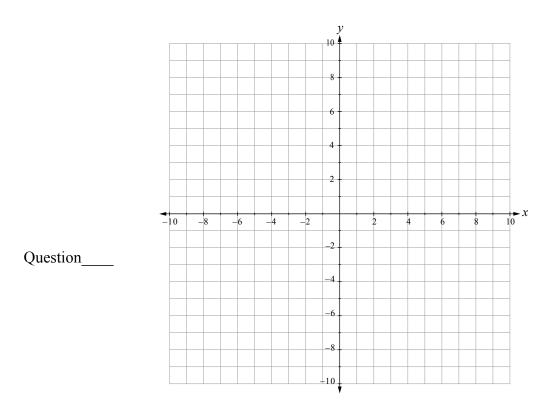CE = $\sqrt{8}$ cm = $2\sqrt{2}$ cm.
BF = 8 cm.
DH = 12 cm.

A mark P is put on the cake tin showing the maximum height that the mixture should come to in the cake tin.
PQ is the thickness of the cake at point P.
The line PQ is 9 cm above the base of the cake tin.

Find the thickness of the cake at PQ.

Diagram
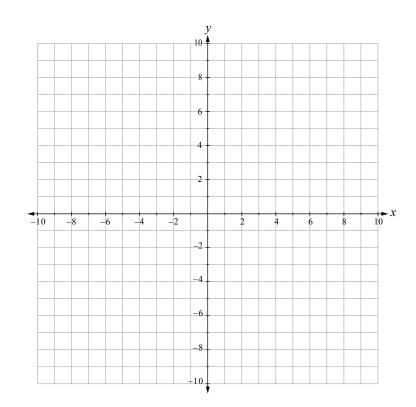NOT
to scale

If you need to redraw a graph from page 2, draw it on a grid below and clearly number the question.
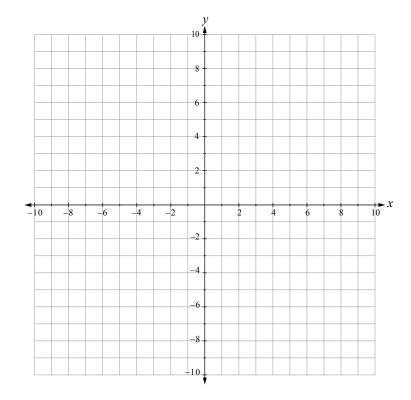Make sure it is clear which graph from each question you want marked.

Question____

Question____

If you need to redraw a graph from page 3, draw it on a grid below and clearly number the question. Make sure it is clear which graph from each question you want marked.
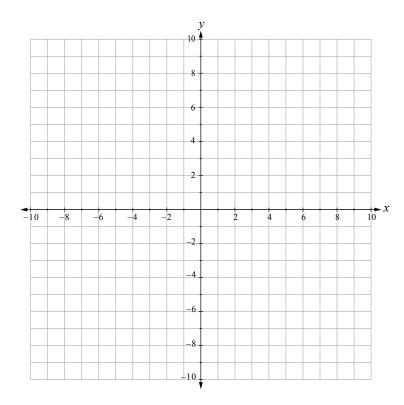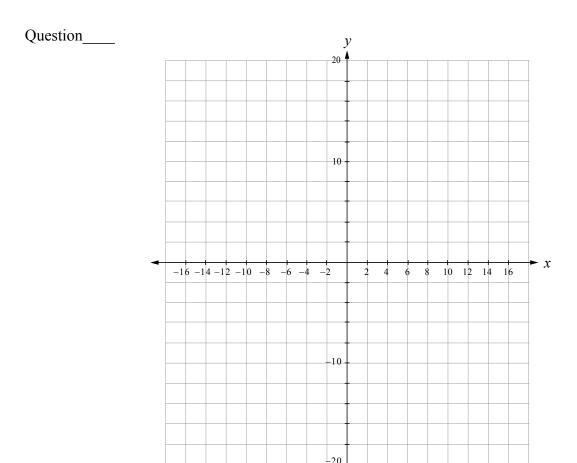
Question____

Question____

If you need to redraw the graph from page 4, draw it on the grid below and clearly number the question.
Make sure it is clear which graph you want marked.

Question____

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

Question____

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

Question
number

90285