90148

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 1 Mathematics, 2005

90148 Sketch and interpret graphs

Credits: Three
9.30 am Monday 21 November 2005

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 2–12 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**	
Sketch, and interpret features of, graphs.	Sketch, and interpret features of, graphs.	Determine and apply an appropriate model for a situation involving graphs.	
	Write equations for linear graphs.		
Overall Level of Performance (all criteria within a column are met)			

You are advised to spend 35 minutes answering the questions in this booklet.
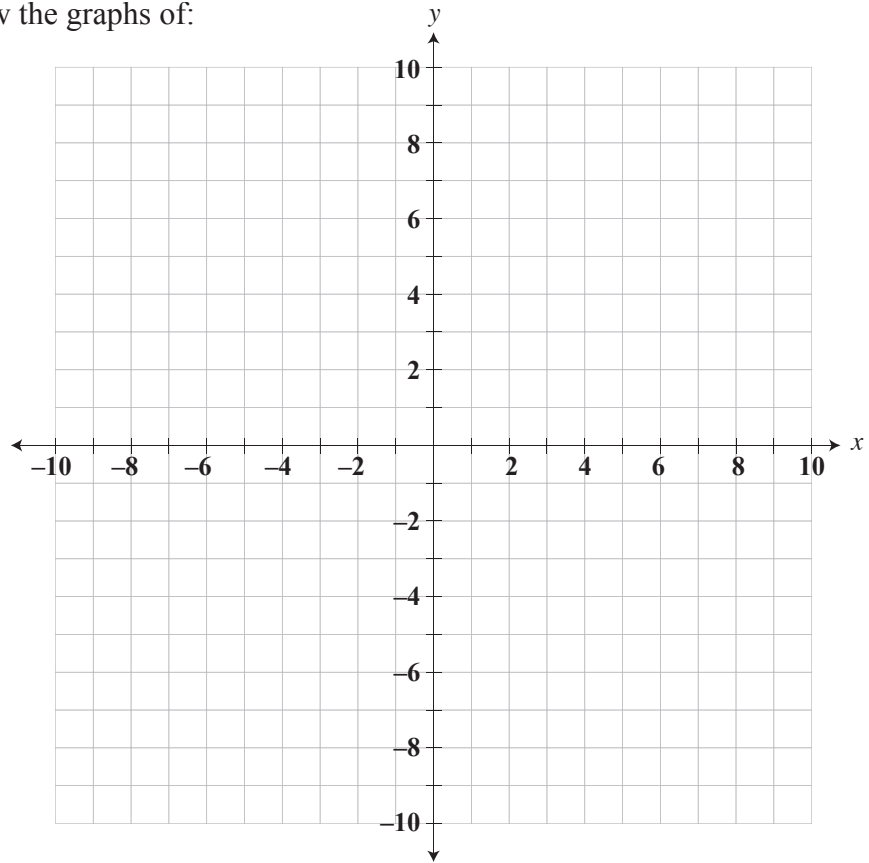
You should show **ALL** working.
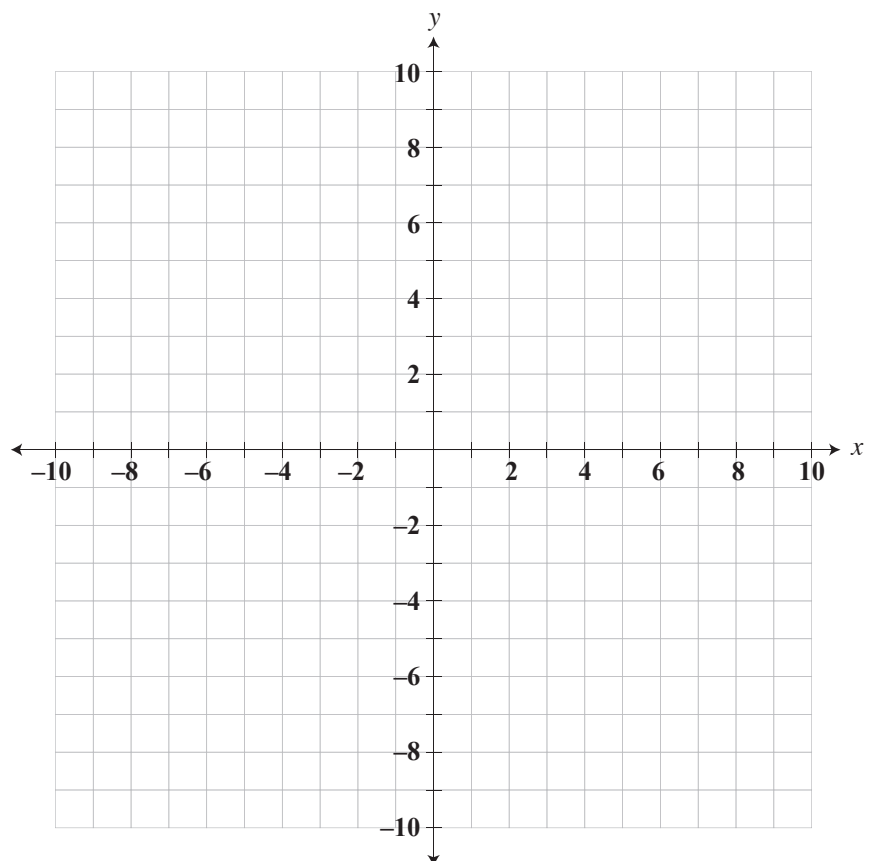
THE TENT

QUESTION ONE
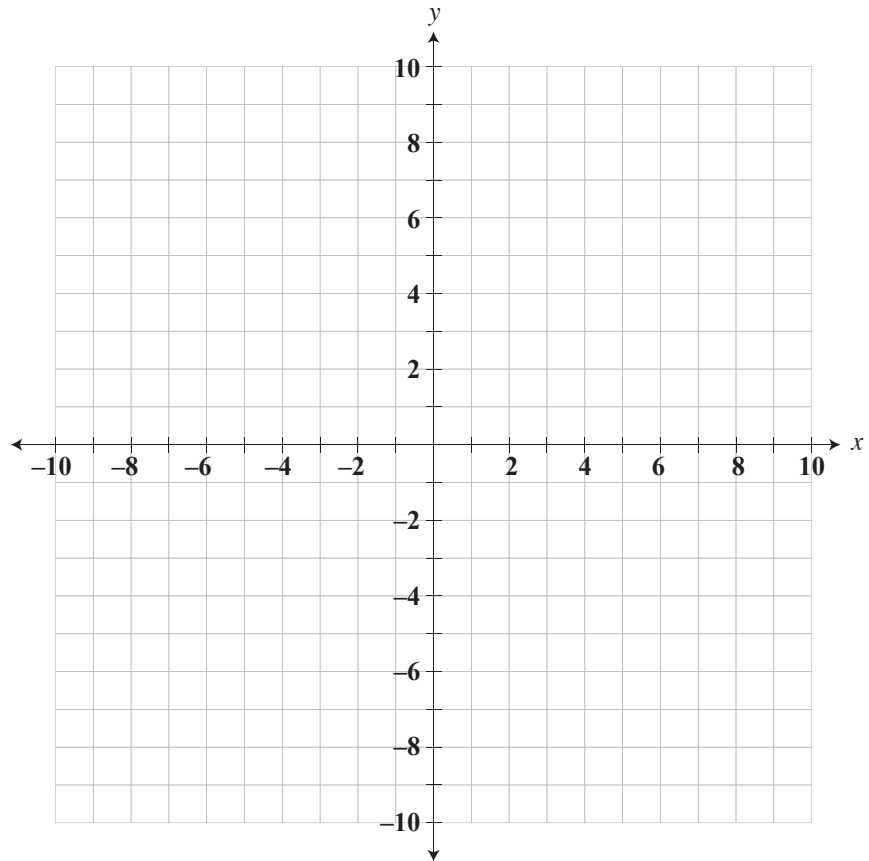
Use the grids alongside to draw the graphs of:

(a) $y = -2x - 6$

(b) $y = 8$

(c) $y = (x - 1)(x + 3)$

**Note: If you need to redraw any of these graphs, you
will find blank grids on page 10.
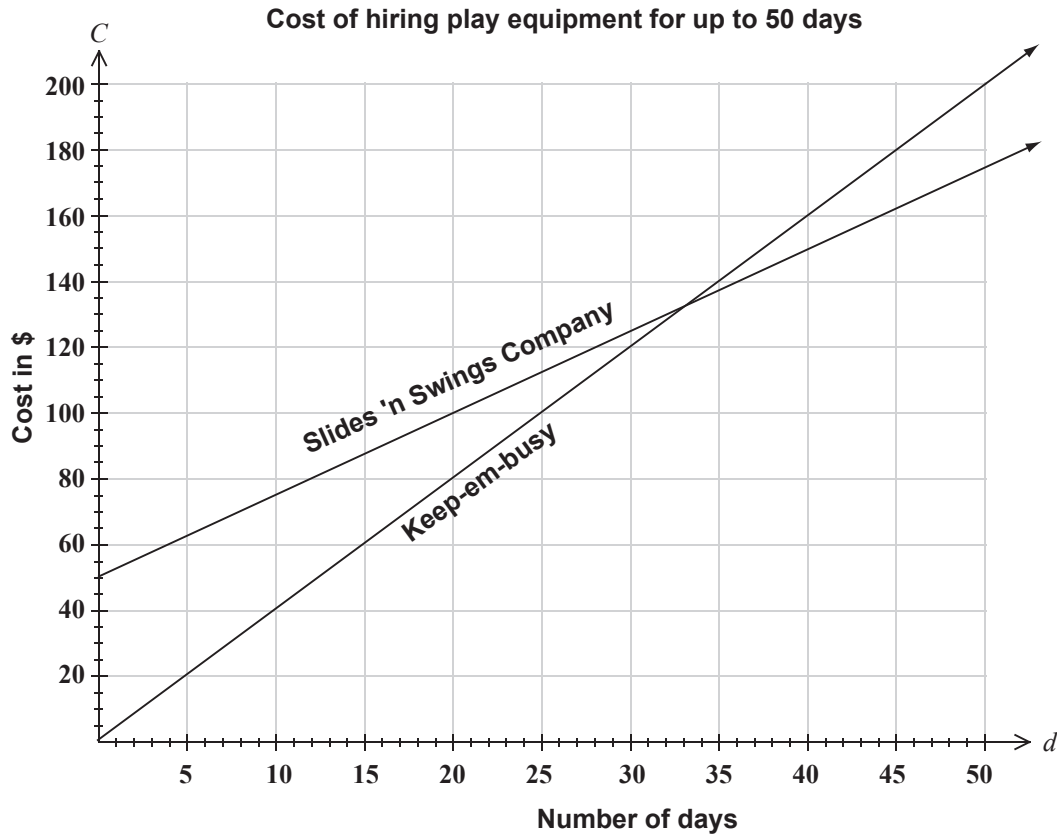Make sure you label the question clearly.
Make sure it is clear which graph you want marked.**

QUESTION TWO

Mere is investigating the cost of hiring play equipment for the holidays.
The *Slides 'n Swings Company* and *Keep-em-busy* hire out the same equipment.
The graph below shows the cost of hiring play equipment for up to 50 days from these two
companies.

Cost of hiring play equipment for up to 50 days
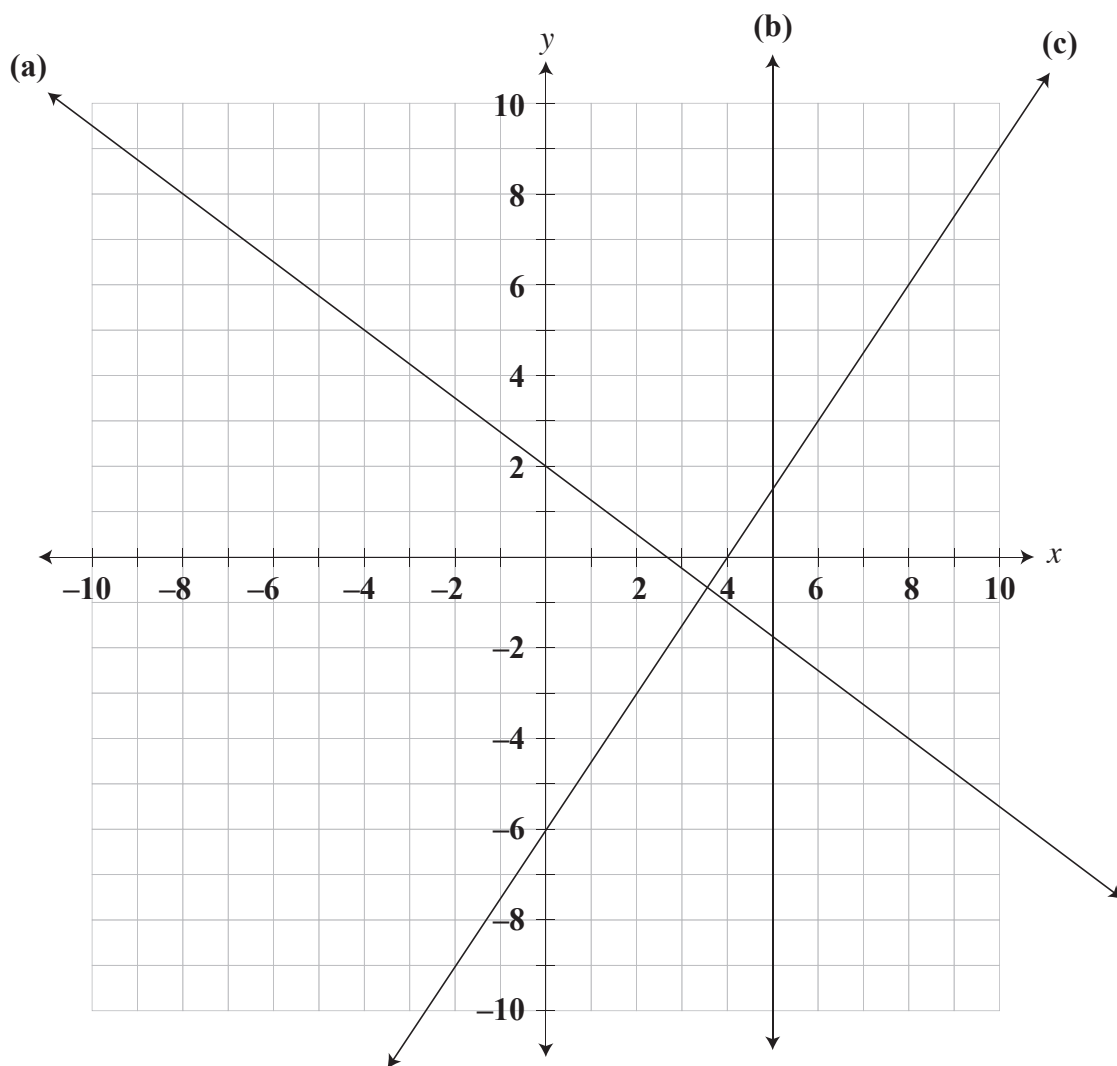
(a) How much does *Keep-em-busy* charge per day?

(b) At the *Slides 'n Swings Company* there is a fixed fee **plus** a daily rate for each hire.
How much is the fixed fee?

(c) Mere decides to hire the play equipment for 42 days. Which firm would be the cheaper?
Explain your answer.

QUESTION THREE
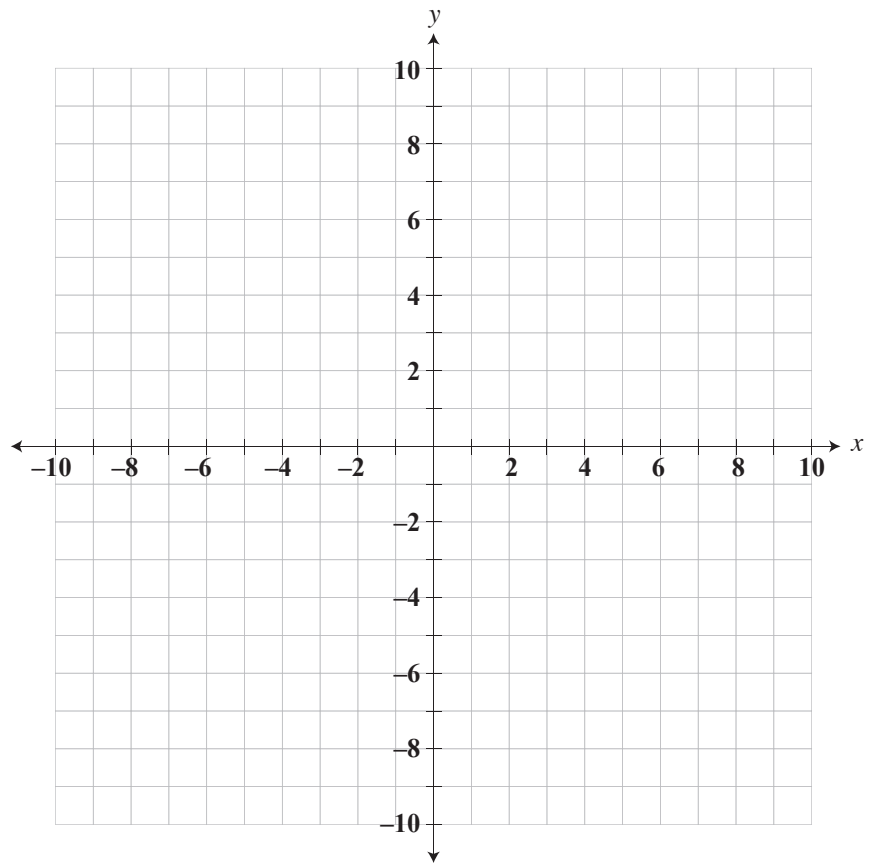
Write the equations of the lines drawn on the grid below:
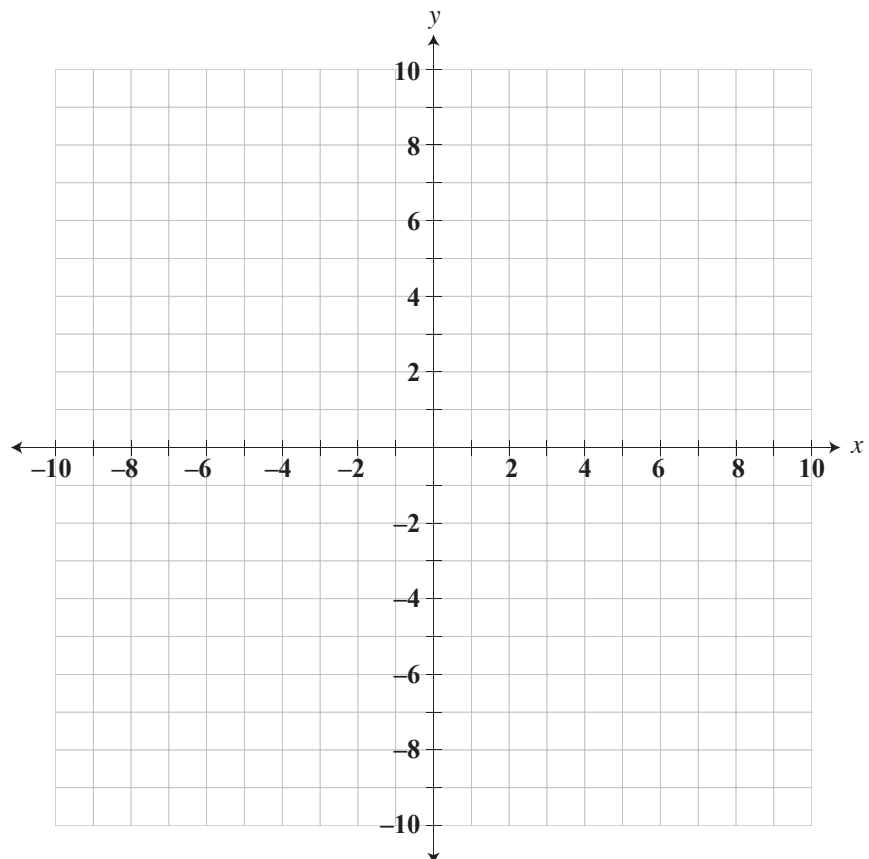
(a) _____

(b) _____

(c) _____

_____

QUESTION FOUR

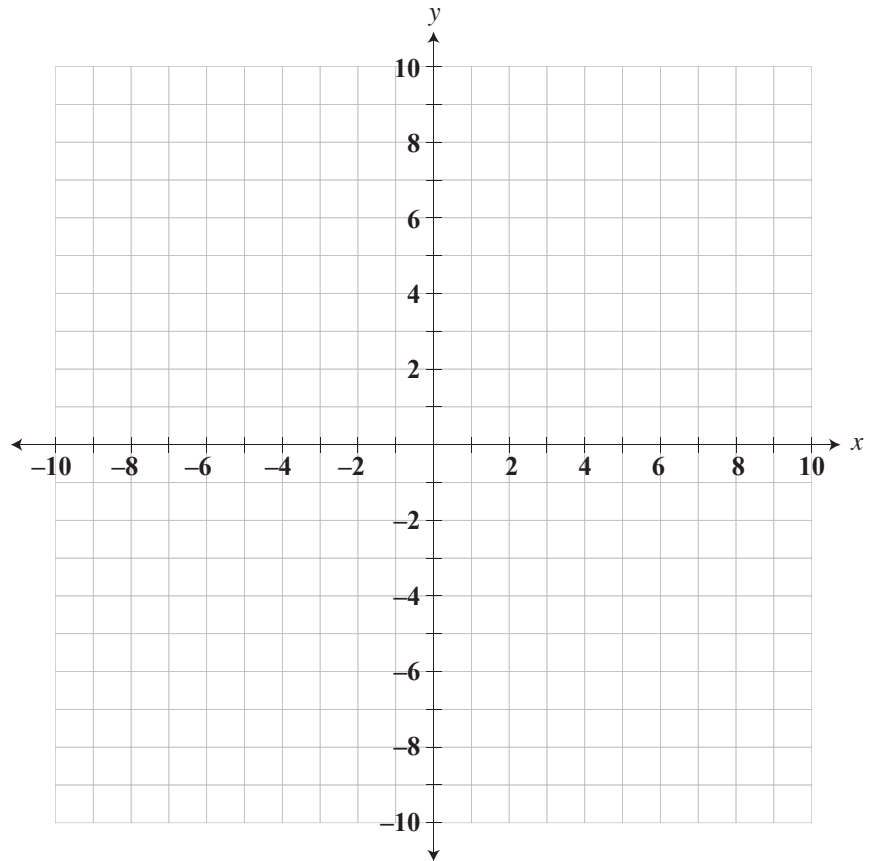Use the grids alongside to draw the graphs of:

(a) $3y - 2x = 12$

(b) $y = 8 + 2x - x^2$
$\quad = (x + 2)(4 - x)$

(c) $y = \dfrac{x^2}{2} - 8$

> **Note: If you need to redraw any of these graphs, you will find blank grids on page 11.**
> **Make sure you label the question clearly.**
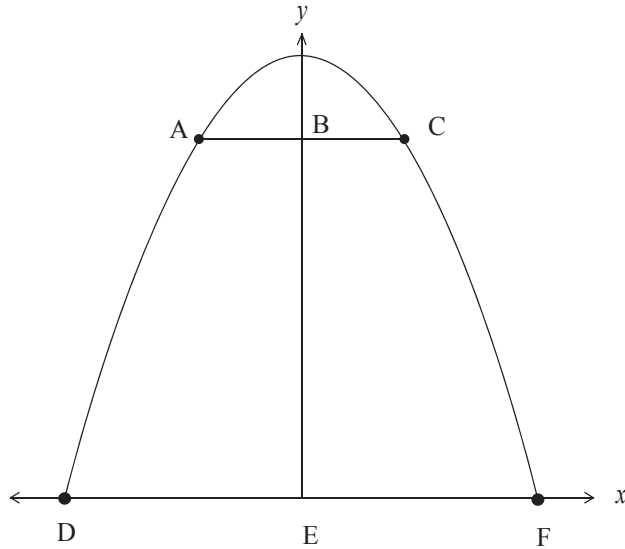> **Make sure it is clear which graph you want marked.**

QUESTION FIVE

(a) Mere buys a small tent for her little sister for Christmas.
The top part is modelled by a parabola.
There are three zips: **BE**, **DE**, and **EF**.
The equation of the frame of the top part of the tent is

$$y = \frac{-x^2}{20} + 80,$$

where y is the height in cm and x is the distance from the centre line in cm.

(i)   What is the height of the top of the tent?

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Height of the top of the tent = _____ cm

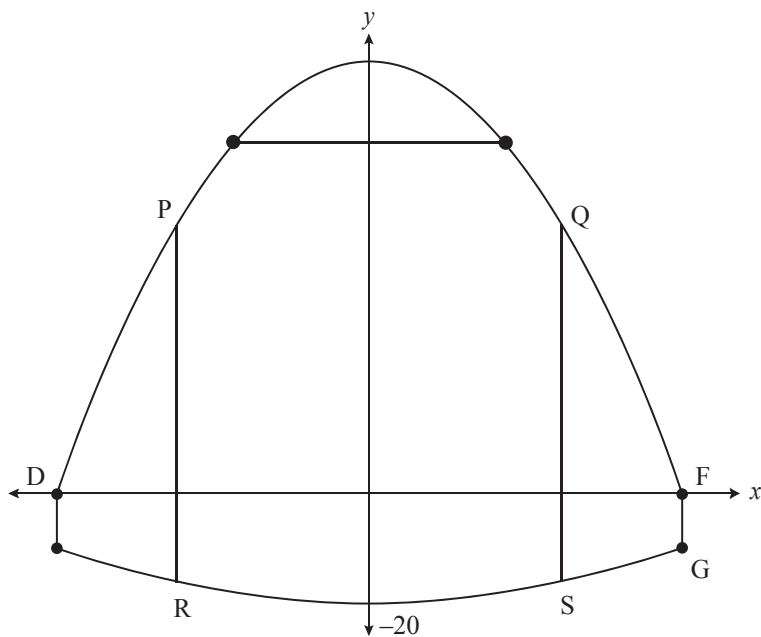(ii)   What is the length of the horizontal zip, **EF**?

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EF = _____ cm

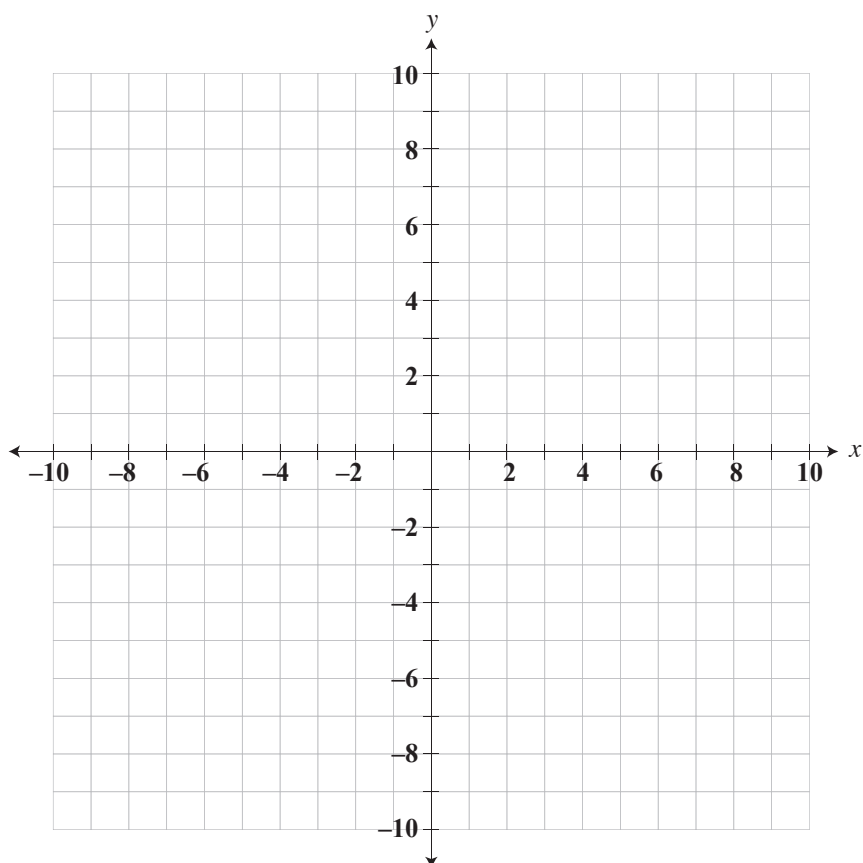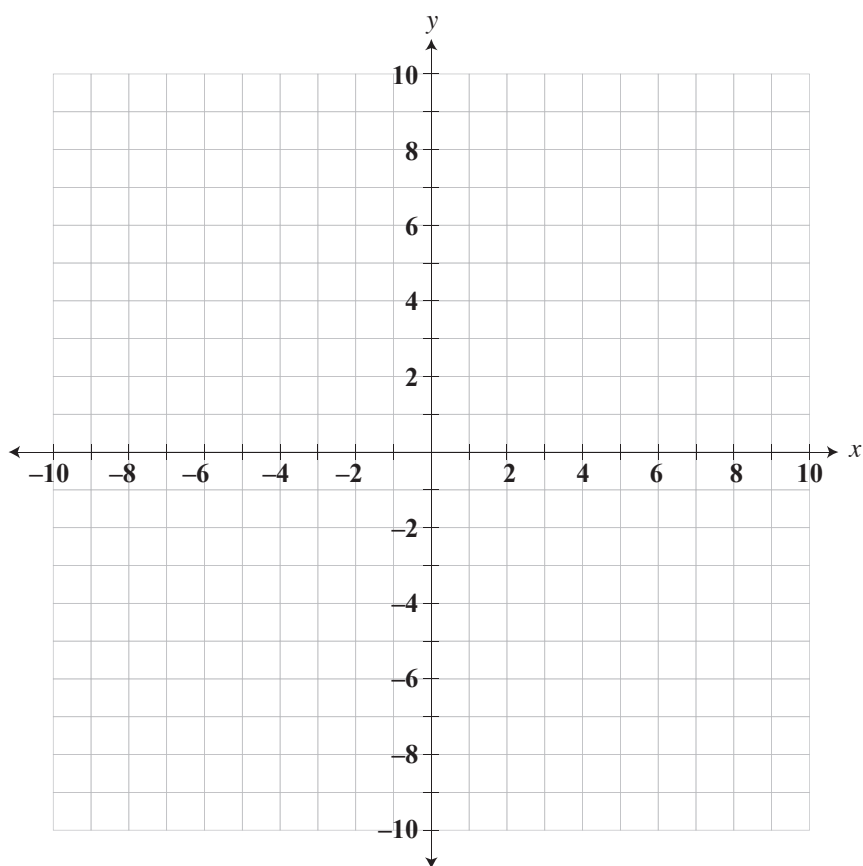(iii)   The length of **AC** is 32 cm.
Find the length of zip **BE**.

_____

_____

_____

_____

BE = _____ cm

(b) Two poles, **PR** and **QS** help keep the tent upright.
They are 25 cm from the centre-line of the tent.
The bottom part of the tent is also modelled by a parabola.
It cuts the vertical axis at $y = -20$.
The length **FG** = 10 cm.

Find the length of the pole **PR**.

> You **must calculate** the length. It is not sufficient to read the length from the graph.
>
> Remember, the equation of the top part of the frame of the tent is $y = \dfrac{-x^2}{20} + 80$.
>
> You will need to find an equation that models the bottom part of the tent.

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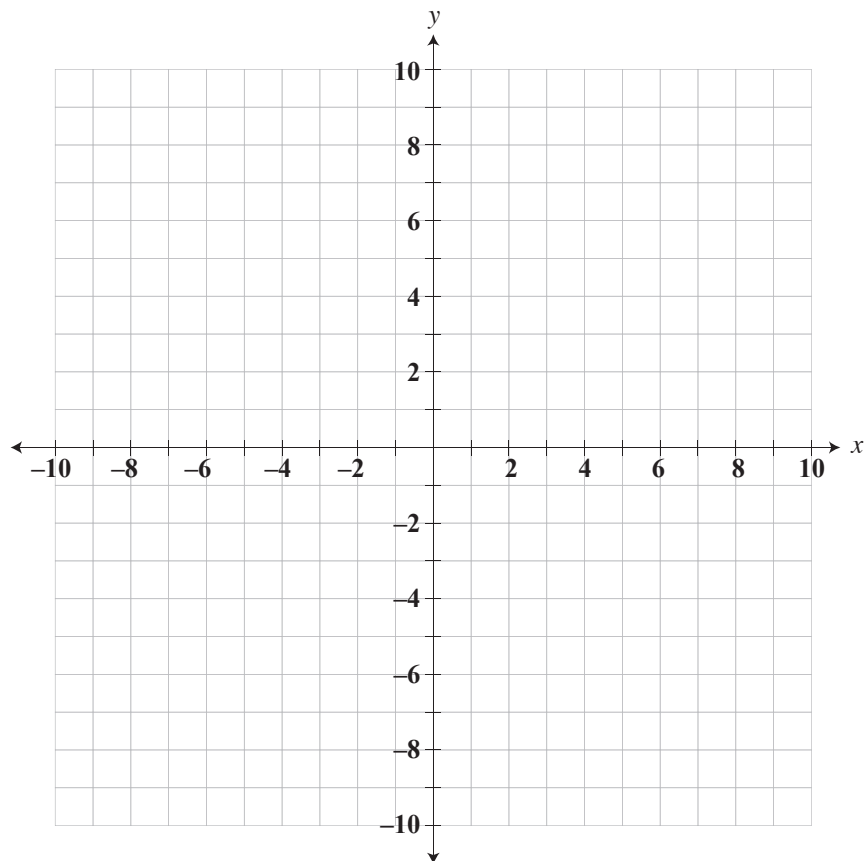
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Use these grids if you need to redraw any of the graphs on pages 2 and 3.
Make sure you label the question clearly.
Make sure it is clear which graph you want marked.
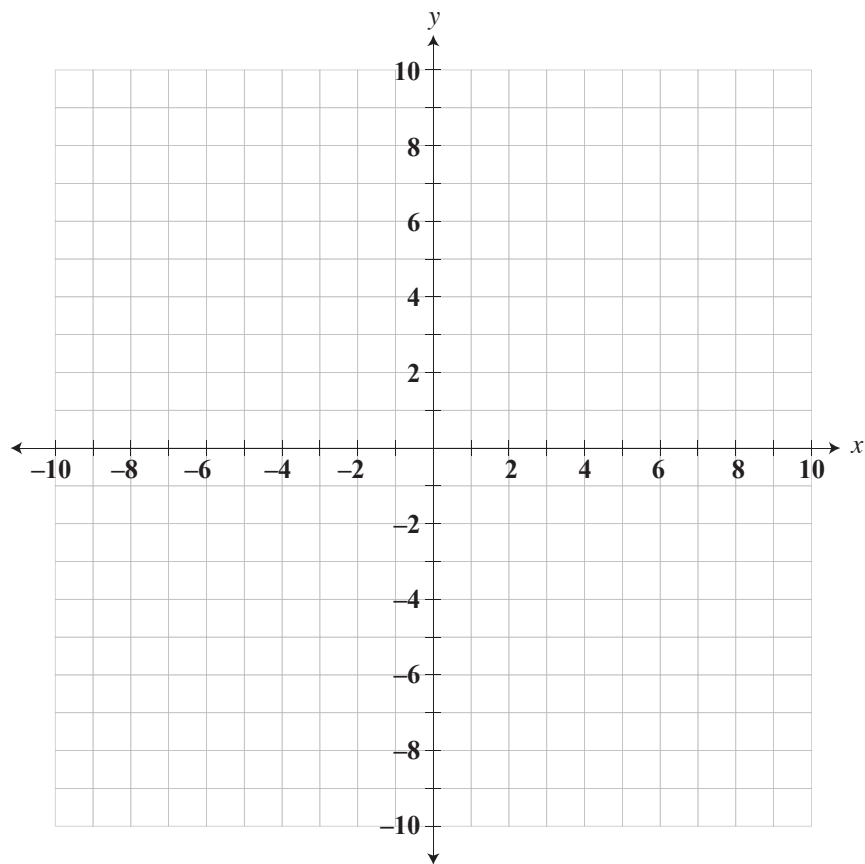
Use these grids if you need to redraw any of the graphs on pages 6 and 7.
Make sure you label the question clearly.
Make sure it is clear which graph you want marked.

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

Question
number