

Level 1 Mathematics, 2009

90148 Sketch and interpret graphs

SAMPLE PAPER

Credits: Three

You should answer ALL the questions in this booklet.

You should show ALL working.

You should answer all questions in this booklet.

The questions in this booklet are NOT in order of difficulty.

If you need more space for any answer, use the pages provided at the back of the booklet and clearly number the question.

YOU MUST HAND THIS BOOKLET TO THE EXAMINER 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"/>	Determine and apply an appropriate model for a situation involving 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.

Note: If you need to redraw any of these graphs, you will find blank grids on page 11.

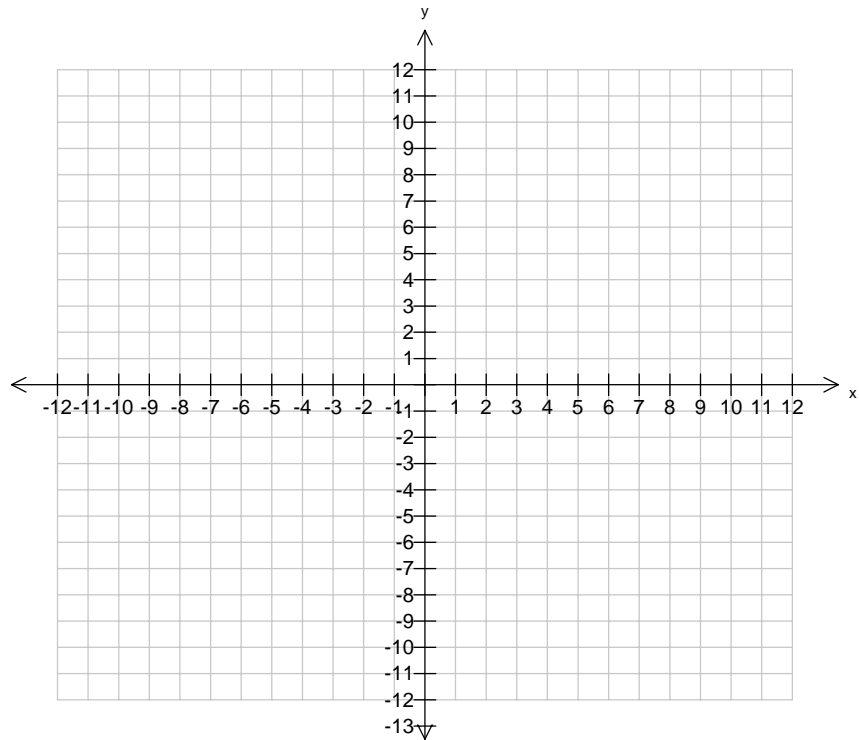
Make sure you show which question you are answering beside each new grid used.

Make sure it is clear which graph you want marked.

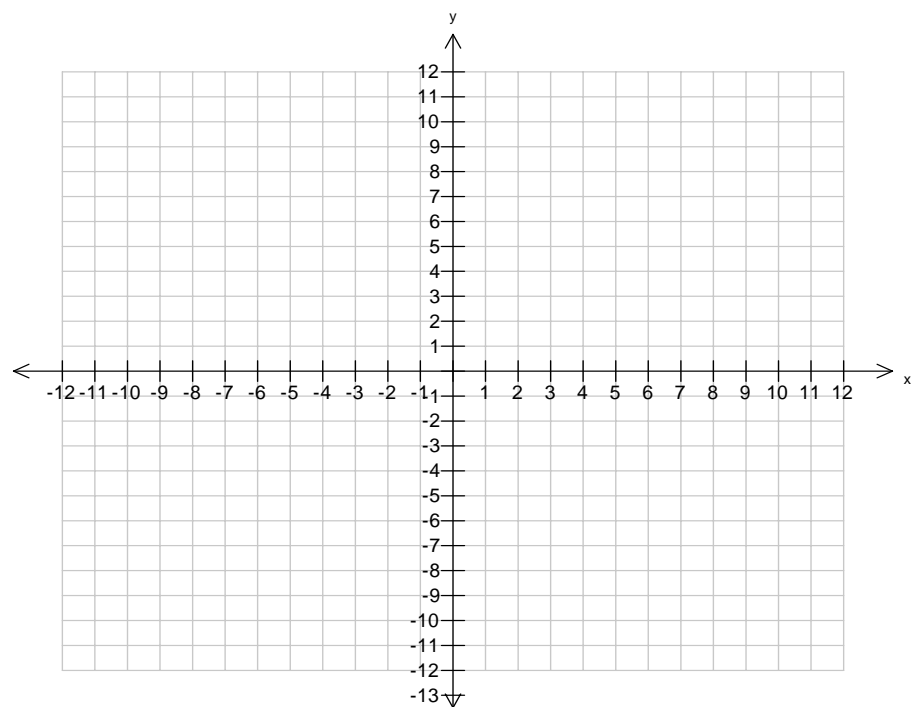
QUESTION ONE

Use the grids alongside to draw the graphs of:

(a) $y = 3x - 2$

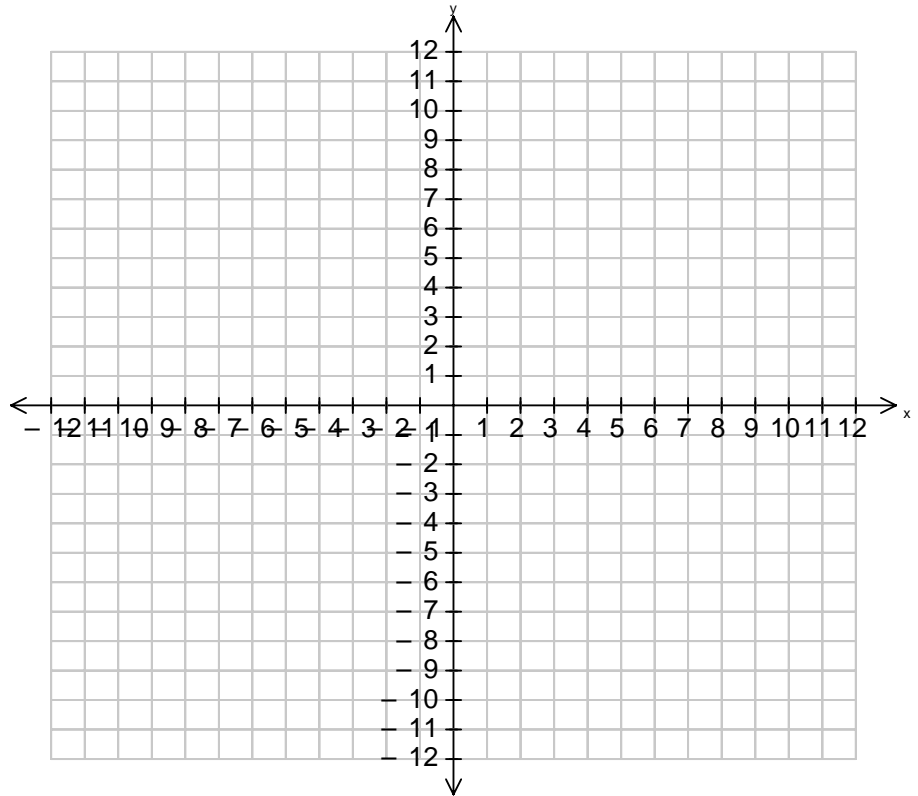


(b) $y = -x^2 + 3$

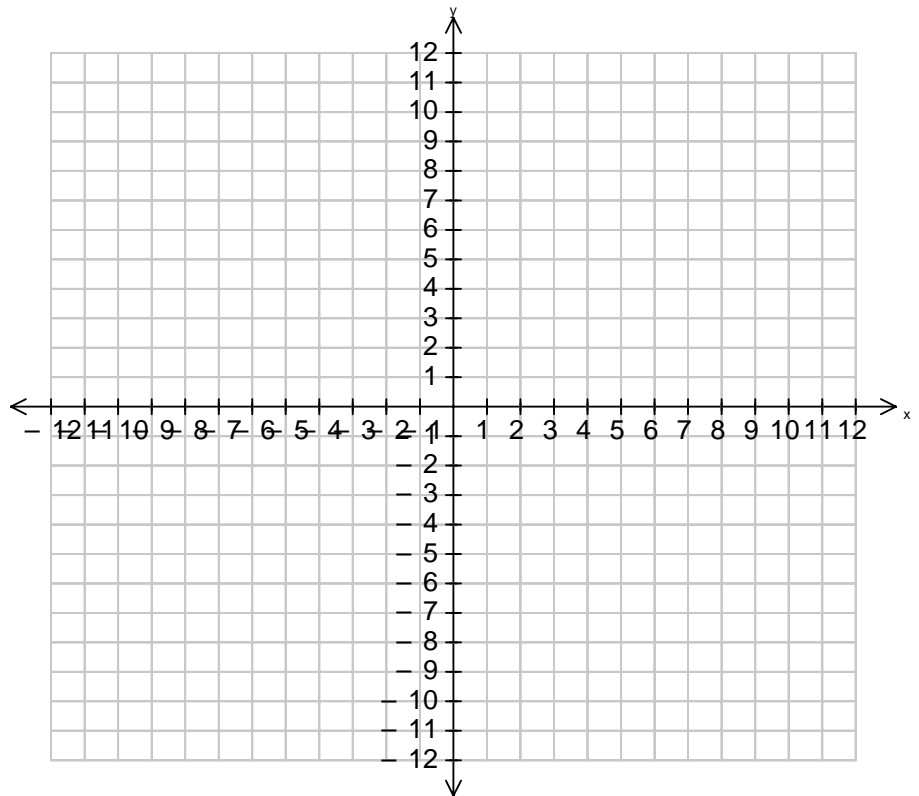


QUESTION ONE (continued)

(c) $y = \frac{1}{2}x^2 - 4$



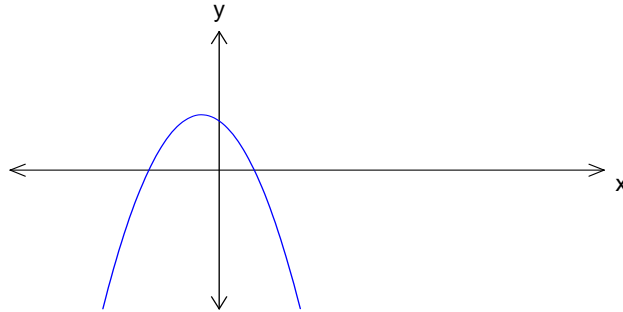
(d) $3x - 4y = 12$



Note: If you need to redraw any of these graphs, you will find blank grids on page 12.
Make sure you show which question you are answering beside each new grid used.
Make sure it is clear which graph you want marked.

QUESTION ONE (continued)

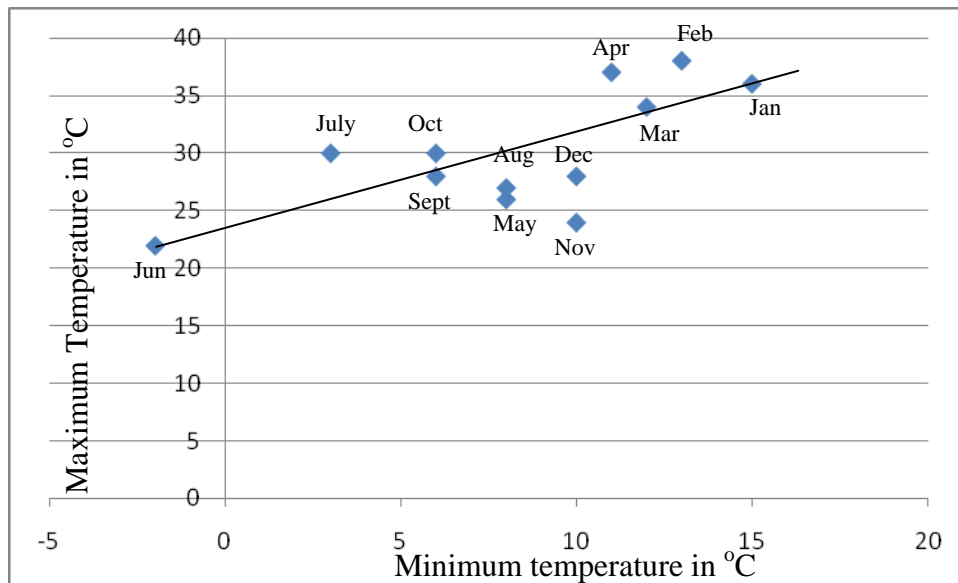
(e) The equation of the parabola drawn on the axes below is $y = -(x + 2)(x - 1)$



If the parabola is moved 3 units to the right and up 5 units give the equation of the parabola in its new position **and** give the y intercept.

QUESTION TWO

- a) Vicky has a small glass house at her home. The glass house is not heated. On the first day of the month Vicky records the maximum and minimum temperatures in the glass house. The information for one year is shown on the graph below.



Vicky thinks that there is a linear relationship between the maximum and minimum temperatures.

- i) From the graph what can be said about July and October?

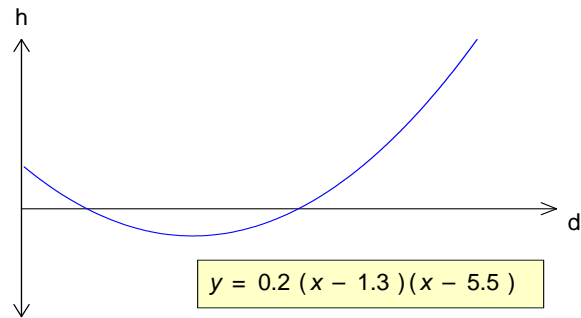
- ii) Use the graph to name 3 months that had a lower than expected maximum temperature on the first day of the month?

b) Some of the sections of a roller coaster track can be modelled by quadratic equations. There are vertical poles and a horizontal beam supporting the track.

i) One section of the track can be modelled by the quadratic equation

$$h = 0.2(d - 1.3)(d - 5.5)$$

where h is the height above the horizontal beam in metres and d is the distance from the start of the track in metres

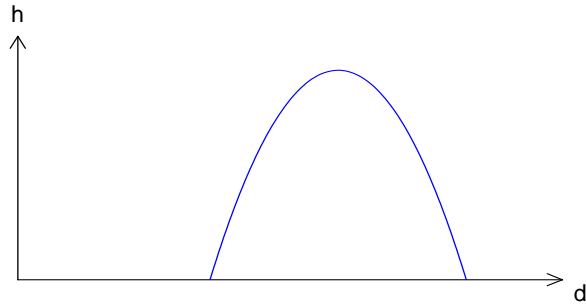


In this section

a) For what distance is the track below the horizontal beam?

b) What is the maximum distance of the track below the beam?

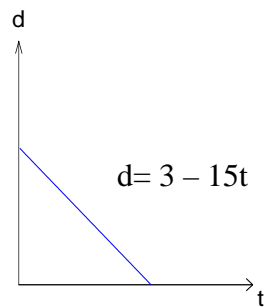
- ii) Another section of the roller coaster track is at the same level as the beam at 6 m from the start of the track and then again at 14 m.
 h is the height of the track above the beam in metres and d is the horizontal distance along the beam.



The maximum height of this section of the roller coaster above the beam is 3.6 m
Find the equation of the parabola.

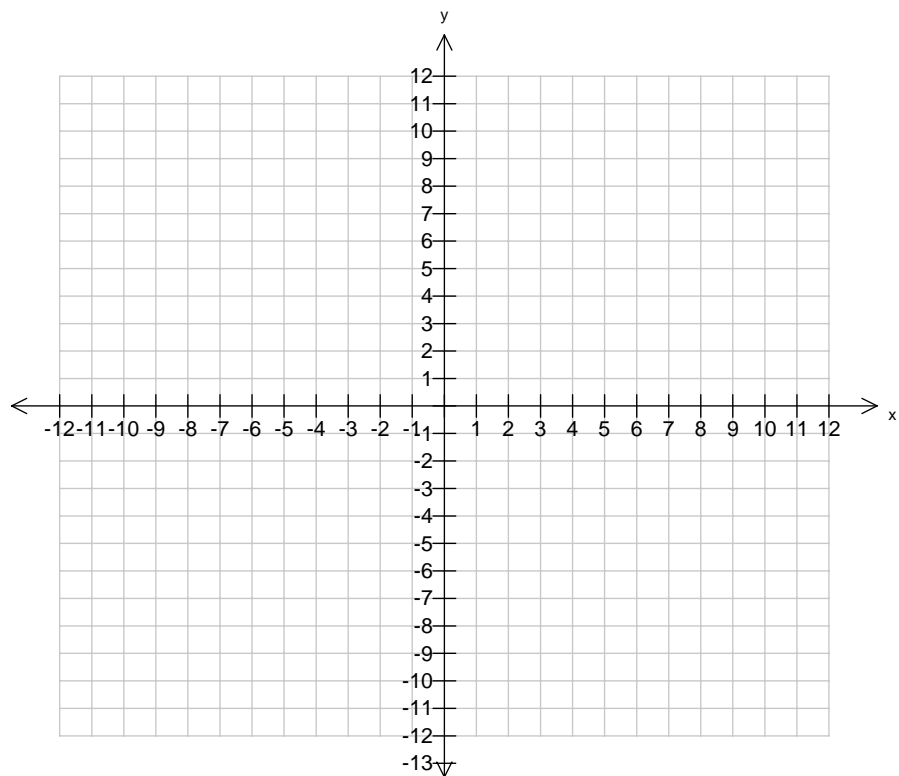
QUESTION THREE

- (a) Fiona is cycling home from school.
The graph and equation below show her distance from home (d kilometres) during the t hour after leaving school.



How long does Fiona take to cycle home from school?

- (b) On the grid below draw $y = -0.5x + 4$

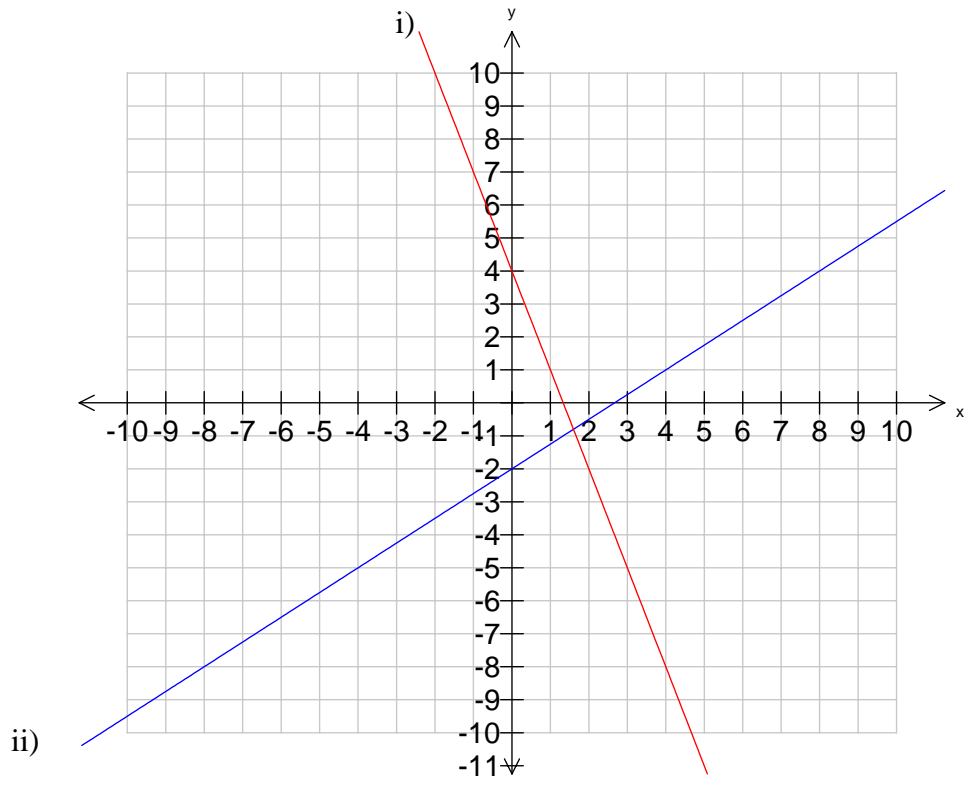


Note: If you need to redraw this graph, you will find blank grids on page 12.

Make sure you show which question you are answering beside each new grid used.

Make sure it is clear which graph you want marked.

c) Write the equations of the lines drawn on the grid below.

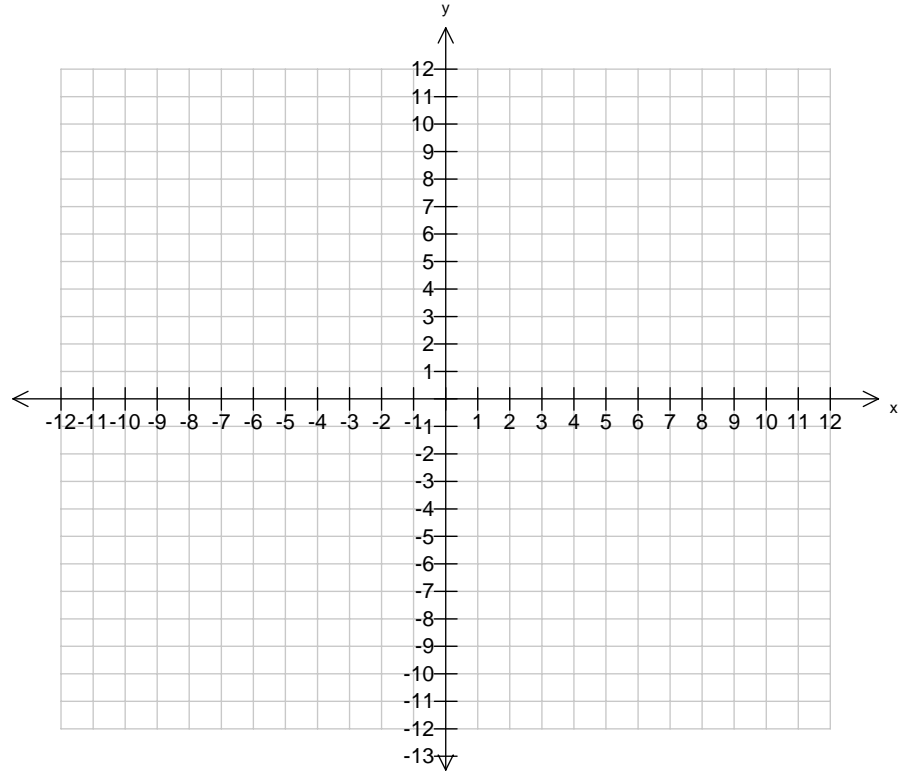


i) _____

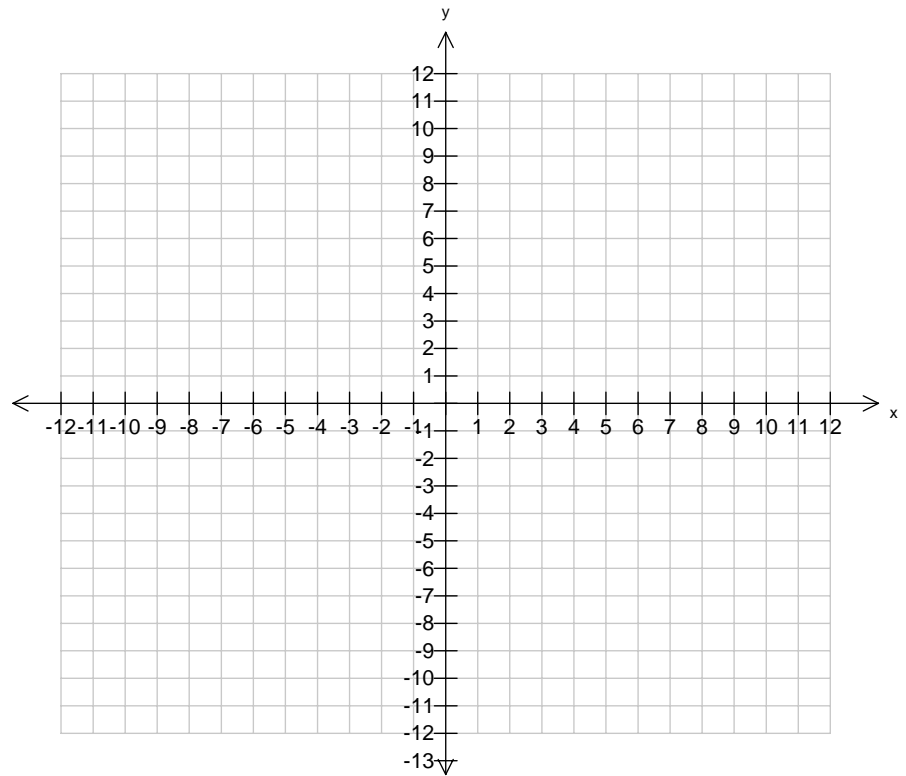
ii) _____

Use these grids if you need to redraw any of the graphs on pages 2 to 8.
Make sure you clearly indicate which question you are answering.
Make sure it is clear which graph you want marked.

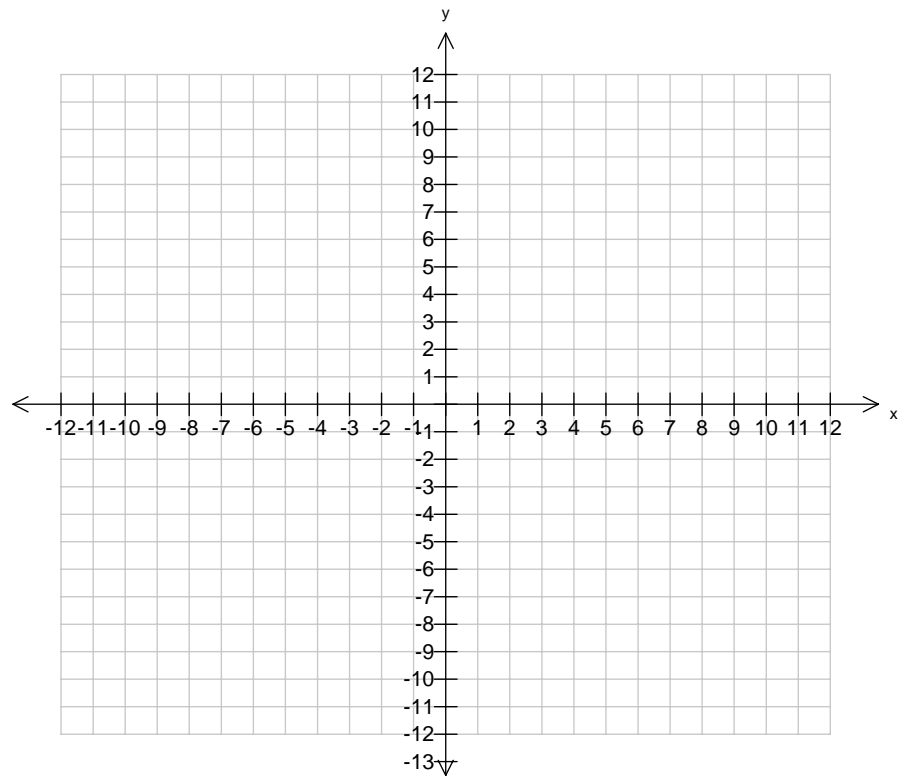
Question: _____



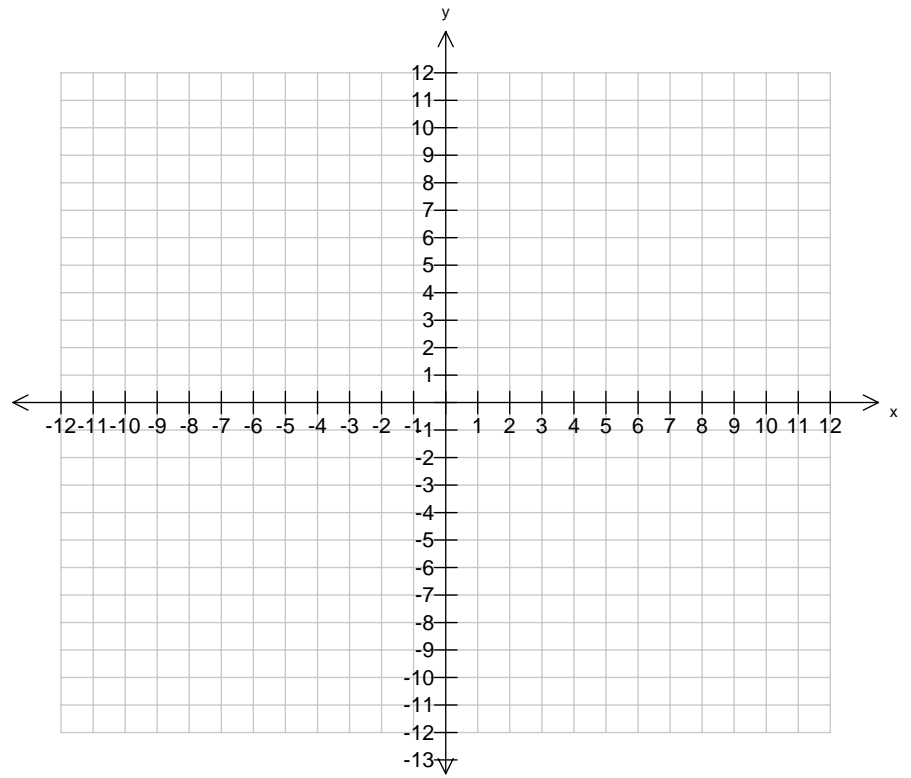
Question: _____



Question: _____



Question: _____



MATHEMATICS ASSESSMENT SCHEDULE - ACHIEVEMENT STANDARD 90148 [1.2] - Sketch and interpret graphs

Question	Achievement	Achievement with Merit	Achievement with excellence	Sufficiency
	Sketch, and interpret features of, graphs.	Sketch, and interpret features of, graphs.	Determine and apply an appropriate model for a situation involving graphs.	
1(a) 1(b) 1(c) 1(d)				A = 1 a or b M = A + 1c or d E = M + 1e
1(e)			$y = -(x - 1)(x - 4) + 5$ $y = -x^2 + 5x + 1$ y intercept 1	
2(a) i)	They have the same maximum temperature			A = 2a i) or 2a ii)
2(a) ii)	Any 3 of May, Aug, Sept, Nov, Dec			M = A plus 2b i) a) or 2b i) b) E = M plus 2b ii)
2(b) i) a)		4.2 m		
2(b) i) b)		0.882 m		
2(b) ii)			$h = -0.225(d - 6)(d - 14)$	

3(a)	12 min or 0.2 hours			
3(b)				$A = 3 \text{ a or b}$ $M = A + 3 \text{ c i) or 3 c ii)}$ $E = M + 3 \text{ d}$
3(c) i)		$y = -3x + 4$		
3(c) ii)		$y = 3/4x - 2$		
3d			$y = -Ax(x - 8)$ $2.4 = A \times 4 \times 4$ $A = 0.15$ $y = 0.15 \times 2 \times 6$ Height of poles = 1.8 m	
Sufficiency	2A	3M	2E	