MME

GCSE MATHEMATICS

AQA | Edexcel | OCR | WJEC

Turning Points of Graphs

Please write clearly in block capitals

Forename:
Surname:

Materials

For this paper you must have:
- mathematical instruments

You ***can*** use a calculator.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice

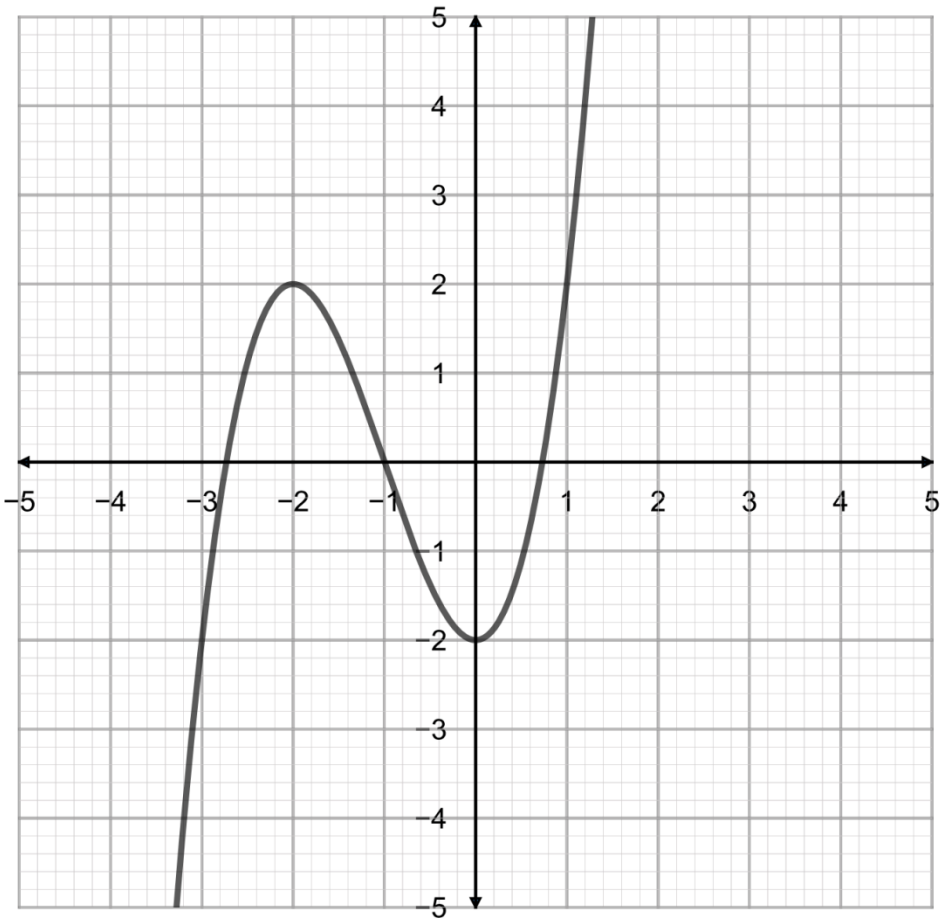
- In all calculations, show clearly how you work out your answer.

1 Define the turning point of a quadratic graph.

[1 mark]

2 Circle the turning points of the graph below.

[2 marks]

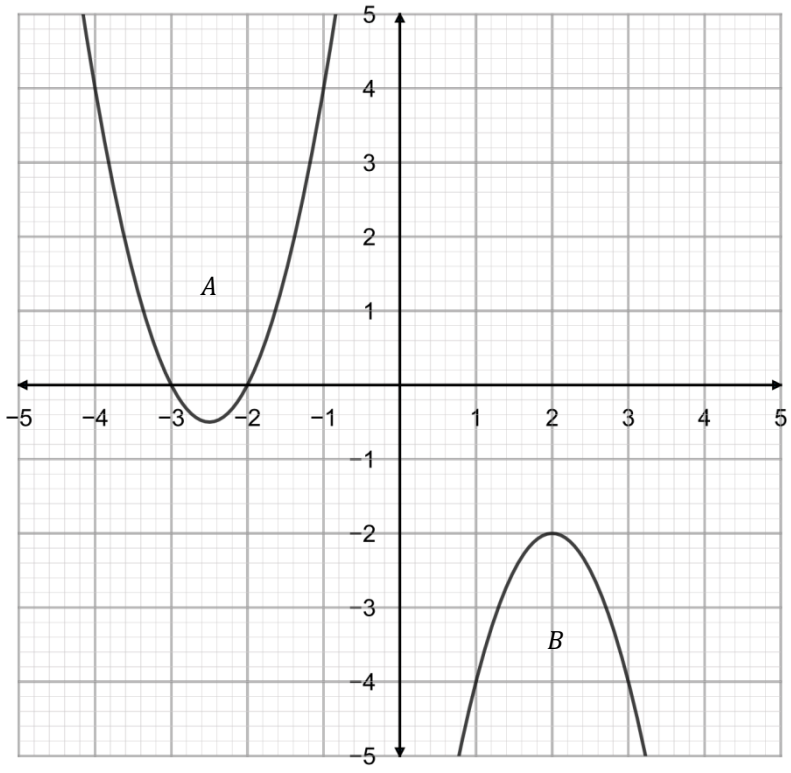


Turn over for next question

3

3(a) Circle the turning points on the two quadratic graphs below.

[2 marks]



3(b) Belle looks at graph A and says, "The turning point is always the minimum point of any quadratic graph". Comment on her statement.

[1 mark]

Turn over for next question

3

4 Find the turning point of the following equations by completing the square.

4(a) $y = x^2 + 4x + 7$

[2 marks]

Answer _____

4(b) $y = 3x^2 + 36x + 99$

[3 marks]

Answer _____

4(c) $y = 2x^2 + 7x - 10$

[3 marks]

Answer _____

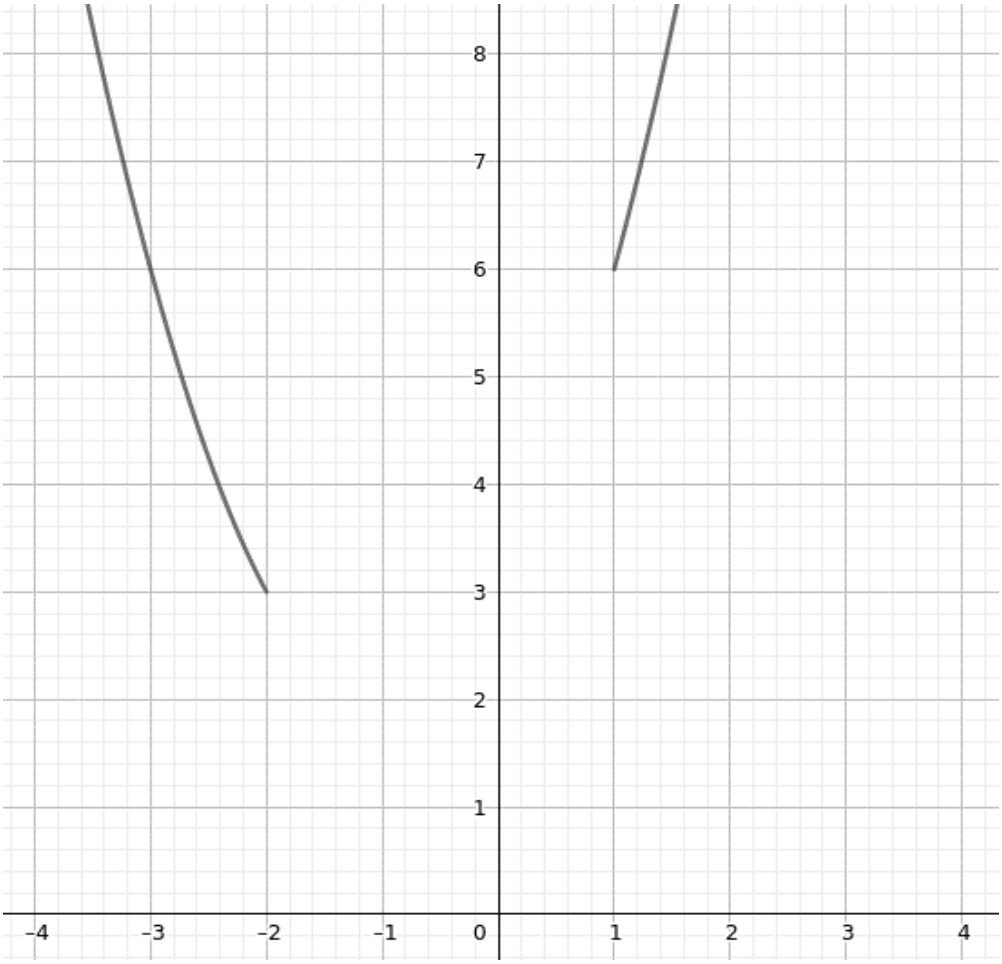
Turn over for next question

8

5 The graph shows a quadratic function with the region between $-2 \leq x < 1$ missing.

5(a) Find the line of symmetry of the quadratic and use this to plot the rest of the curve.

[1 mark]



5(b) What are the coordinates of the turning point of the curve?

[1 mark]

Answer _____

Turn over for next question

2

6 Given that:

$$f(x) = x - 4$$

$$g(x) = x^2$$

6(a) Find the turning point of each curve and comment on them with relation to f(x).

$fg(x)$:

[2 marks]

Answer _____

6(b) $gf(x)$:

[2 marks]

Answer _____

6(c) Comment on your answers

[1 mark]

End of Questions

5

END