

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.

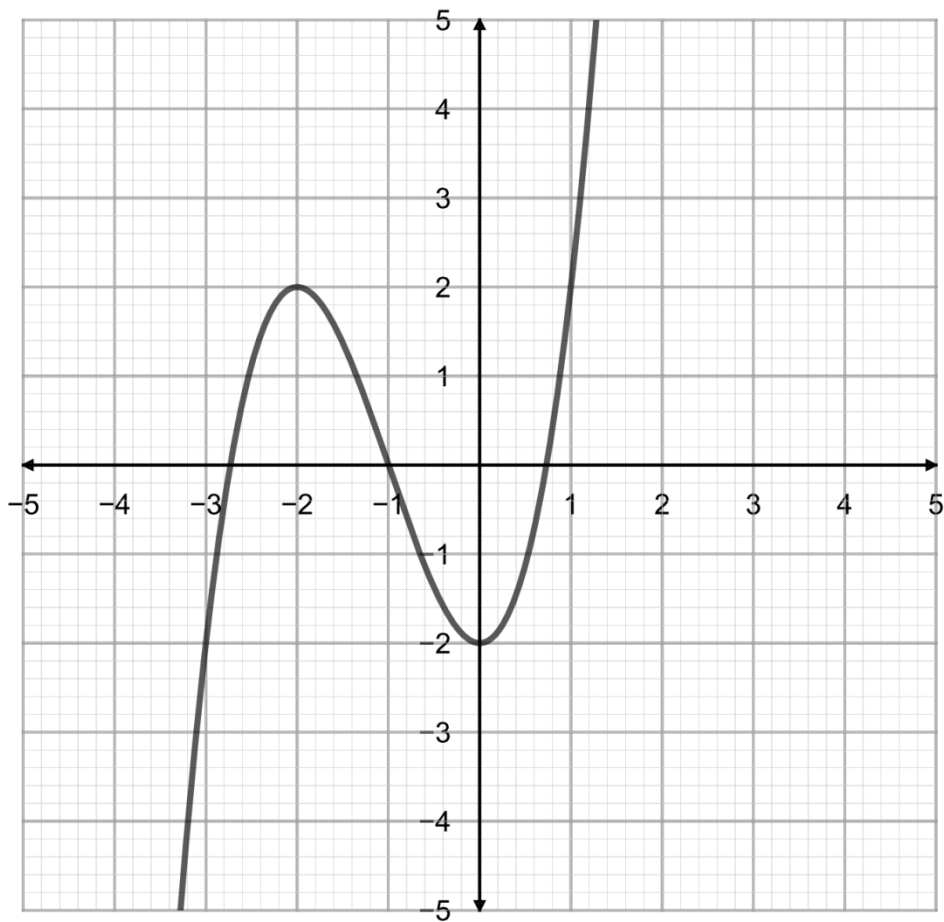
(Level 5)

[1 mark]

- 2 Circle the turning points of the graph below.

(Level 5)

[2 marks]



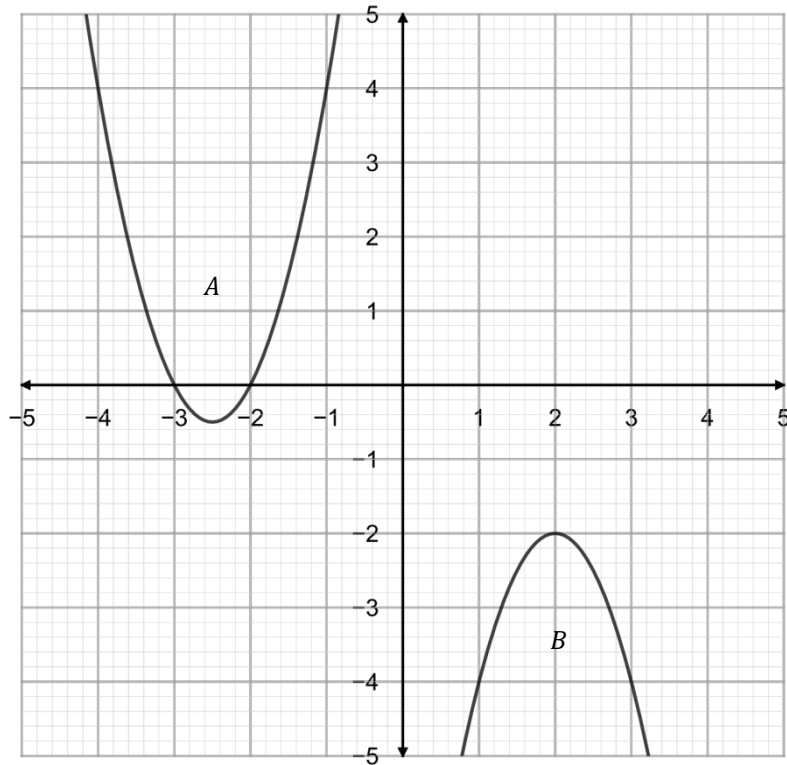
Turn over for next question

Turn over ►

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

(Level 5)

[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

4 Find the turning point of the following equations by completing the square. (Level 6)

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]

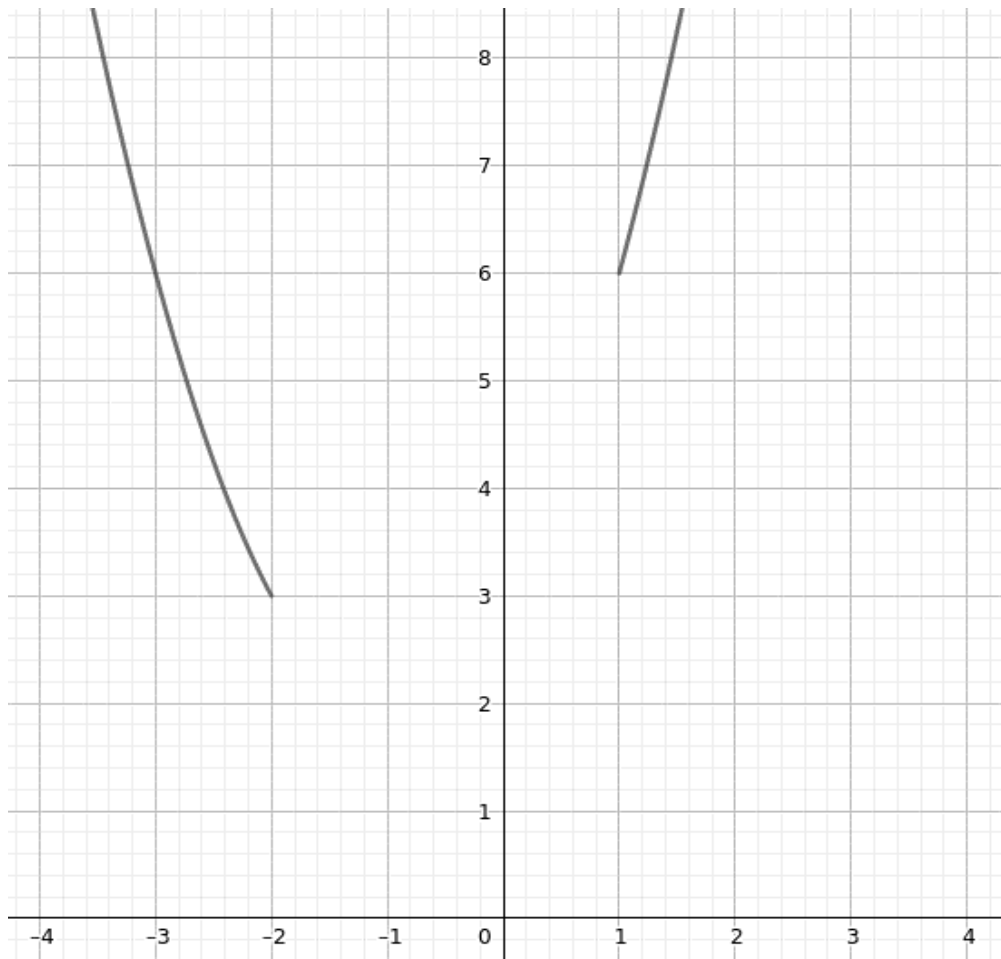
Answer _____

Turn over for next question

5 The graph shows a quadratic function with the region between $-2 \leq x < 1$ missing. (Level 6)

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

[1 mark]



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

[1 mark]

Answer _____

Turn over for next question

6 Given that:

(Level 7)

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

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

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