

Name:

Date:

Completing the Square

GCSE

Edexcel
Mathematics
Grade (9-1)

Mark

Score (%)

— 99

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Materials

For this paper you must have:

- Ruler
- Pencil, Rubber, Protractor and Compass
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown
- Do all rough work in this book. Cross out any rough work you don't want to be marked

Information

- The marks for the questions are shown in brackets

1 Write $x^2 + 8x + 4$ in the form $(x + a)^2 + b$

Leave
blank

.....
(Total 2 marks)

2 Write $x^2 + 10x + 2$ in the form $(x + a)^2 + b$

.....
(Total 2 marks)

3 Write $x^2 + 2x - 4$ in the form $(x + a)^2 + b$

.....
(Total 2 marks)

4 Write $x^2 + 14x + 6$ in the form $(x + a)^2 + b$

.....
(Total 2 marks)

5 Write $x^2 - 4x - 9$ in the form $(x + a)^2 + b$
Hence write down the co-ordinates of the turning point.

Leave
blank

.....
(Total 3 marks)

6 Write $x^2 - 4x - 17$ in the form $(x + a)^2 + b$
Hence write down the co-ordinates of the turning point.

.....
(Total 3 marks)

7 Write $x^2 - 8x$ in the form $(x + a)^2 + b$
Hence write down the co-ordinates of the turning point.

.....
(Total 3 marks)

8 Write $x^2 - 4x - 10$ in the form $(x + a)^2 + b$
Hence write down the co-ordinates of the turning point.

.....
(Total 3 marks)

9 Solve $x^2 + 4x - 1 = 0$ using completing the square method.

Leave
blank

.....
(Total 3 marks)

10 Solve $x^2 - 7x - 3 = 0$ using completing the square method.

.....
(Total 3 marks)

11 Solve $x^2 + 6x + 1 = 0$ using completing the square method.

.....
(Total 3 marks)

12 Solve $x^2 = 2x + 10$ using completing the square method.

Leave
blank

.....
(Total 3 marks)

13 Solve $2x^2 - 11x - 30 = x^2 - x$ using completing the square method.

.....
(Total 3 marks)

14 Solve $x^2 + 4x - 16 = 0$ using completing the square method.

.....
(Total 3 marks)

15 Write $3x^2 + 12x + 3$ in the form $a(x + b)^2 + c$

Leave
blank

.....
(Total 3 marks)

16 Write $2x^2 + 8x + 4$ in the form $a(x + b)^2 + c$

.....
(Total 3 marks)

17 Write $2x^2 + 12x + 2$ in the form $a(x + b)^2 + c$

.....
(Total 3 marks)

18 Write $2x^2 + 16x + 4$ in the form $a(x + b)^2 + c$
Hence write down the co-ordinates of the turning point.

.....
(Total 4 marks)

19 Write $4x^2 + 16x + 8$ in the form $a(x + b)^2 + c$
Hence write down the co-ordinates of the turning point.

.....
(Total 4 marks)

20 Write $7x^2 + 28x + 7$ in the form $a(x + b)^2 + c$
Hence write down the co-ordinates of the turning point.

.....
(Total 4 marks)

Leave
blank

21 Solve $3x^2 + 18x + 3 = 0$ using completing the square method.

.....
(Total 4 marks)

22 Solve $3x^2 + 12x + 9 = 0$ using completing the square method.

.....
(Total 4 marks)

23 Solve $3x^2 + 12x - 27 = 0$ using completing the square method.

.....
(Total 4 marks)

24 Solve $3x^2 + 30x + 4 = 0$ using completing the square method.

.....
(Total 4 marks)

25 Solve $3x^2 + 12x + 3 = 0$ using completing the square method.

.....
(Total 4 marks)

26 Solve $3x^2 + 12x - 3 = 0$ using completing the square method.

.....
(Total 4 marks)

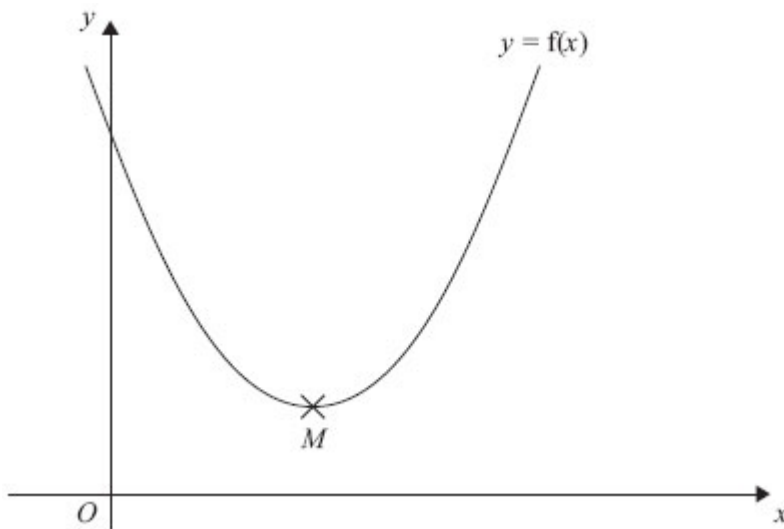
- 27 The expression $x^2 - 8x + 27$ can be written in the form $(x - a)^2 + b$ for all values of x .
 (a) Find the value of a and the value of b .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

(3)

The equation of a curve is $y = f(x)$ where $f(x) = x^2 - 8x + 27$.
 The diagram shows part of a sketch of the graph of $y = f(x)$.



- The minimum point of the curve is M .
 (b) Write down the coordinates of M .

$\dots\dots\dots$

(1)

(Total 4 marks)

Leave blank

28 Use completing the square to find the minimum point of the curve $y = x^2 + 4x + 9$ and sketch the curve.

.....
(Total 4 marks)

29 Use completing the square to find the minimum point of the curve $y = x^2 + 6x + 15$ and sketch the curve.

.....
(Total 4 marks)

30 Use completing the square to find the minimum point of the curve $y = x^2 + 4x + 9$ and sketch the curve.

.....
(Total 4 marks)