

AQA Level 2 Certificate in FURTHER MATHEMATICS (8365/1)

Paper 1

Specimen 2020

Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:

- mathematical instruments

You may **not** use a calculator



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the bottom of this page.
- Answer **all** questions.
- You must answer the questions in the space 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 that you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number Candidate number

Surname

Forename(s)

Candidate signature _____

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Answer **all** questions in the spaces provided.

1 (a) $\frac{y^6 \times y}{y^m} = y^4$

Circle the value of m .

[1 mark]

-2

1.5

2

3

1 (b) $a^n \times a^5 = a^5$

Work out the value of n .

[1 mark]

Answer _____

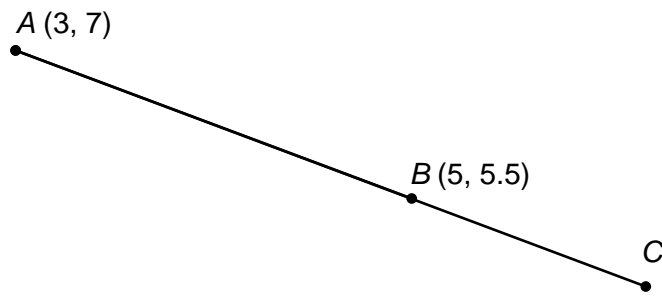
1 (c) $(c^5)^p = (c^2)^6$

Work out the value of p .

[2 marks]

Answer _____

4 ABC is a straight line with $AB : BC = 5 : 2$



Work out the coordinates of C .

[4 marks]

Answer (_____ , _____)

5 $y = 2x^{10} - \frac{3}{x^2}$

Work out $\frac{dy}{dx}$

[3 marks]

Answer _____

6 Simplify fully $\frac{15x^2y - 5xy^2}{12x - 4y}$

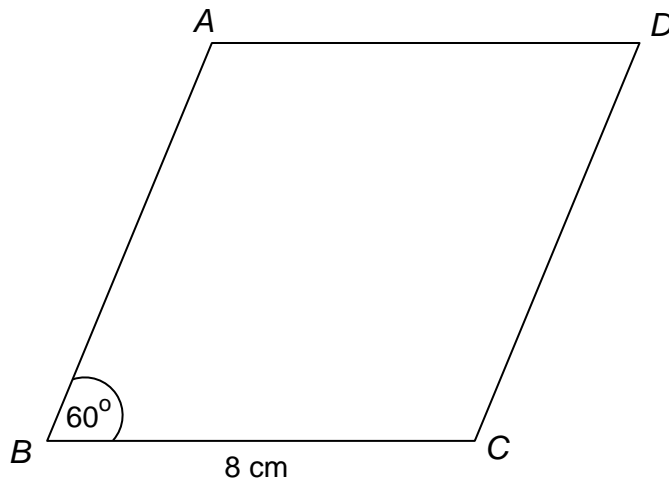
[3 marks]

Answer _____

7

$ABCD$ is a rhombus with side length 8 cm

Angle $ABC = 60^\circ$



Not drawn
accurately

Work out the area of the rhombus.

Give your answer in the form $a\sqrt{b}$ cm² where a and b are integers.

[3 marks]

Answer _____ cm²

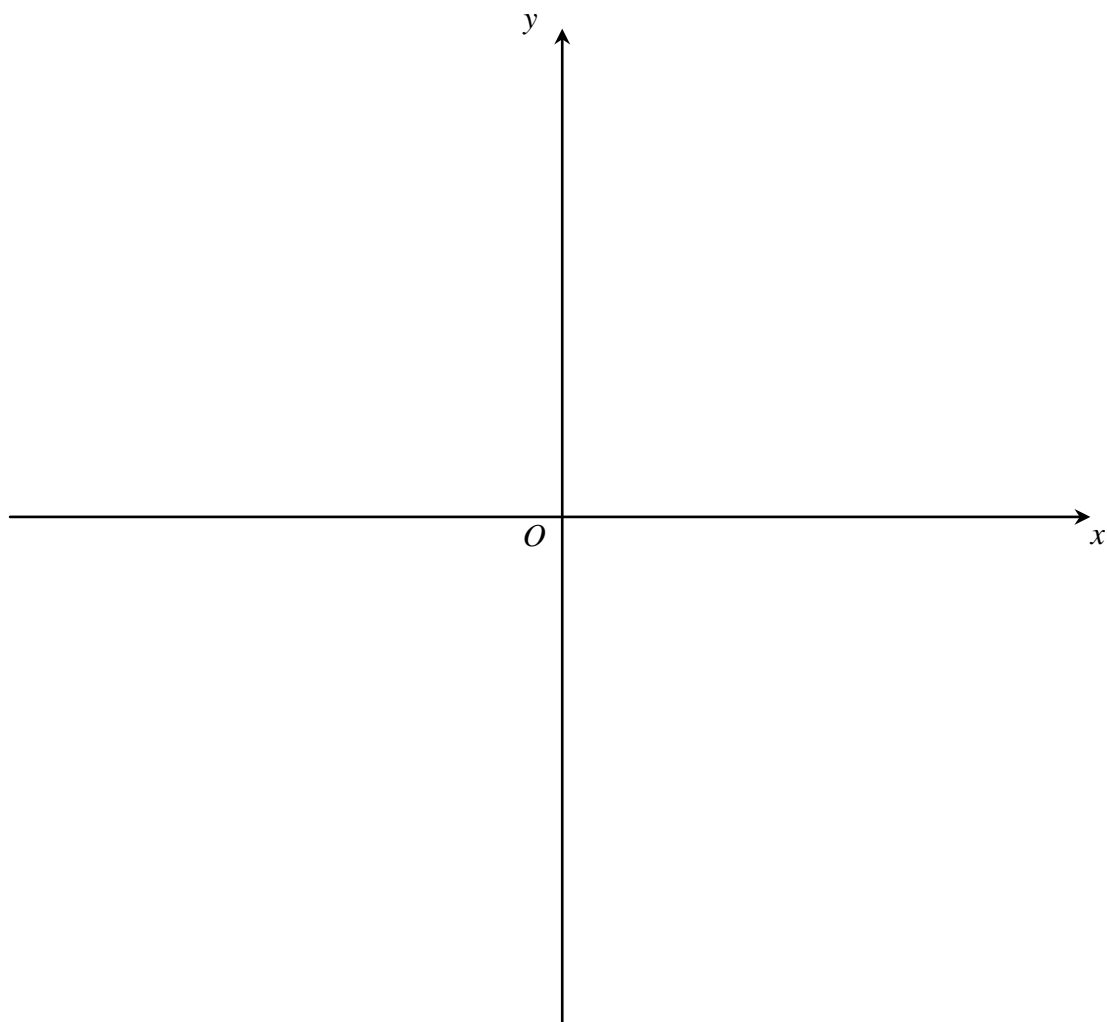
- 8 The curve $y = 2x^3 - 3x^2 - 12x + 6$
has a maximum point at $L (-1, 13)$
has a minimum point at $M (2, -14)$
intersects the y -axis at N .

The curve crosses the x -axis at three distinct points.

On the axes below, sketch the curve.

Label the points L , M and N on your sketch.

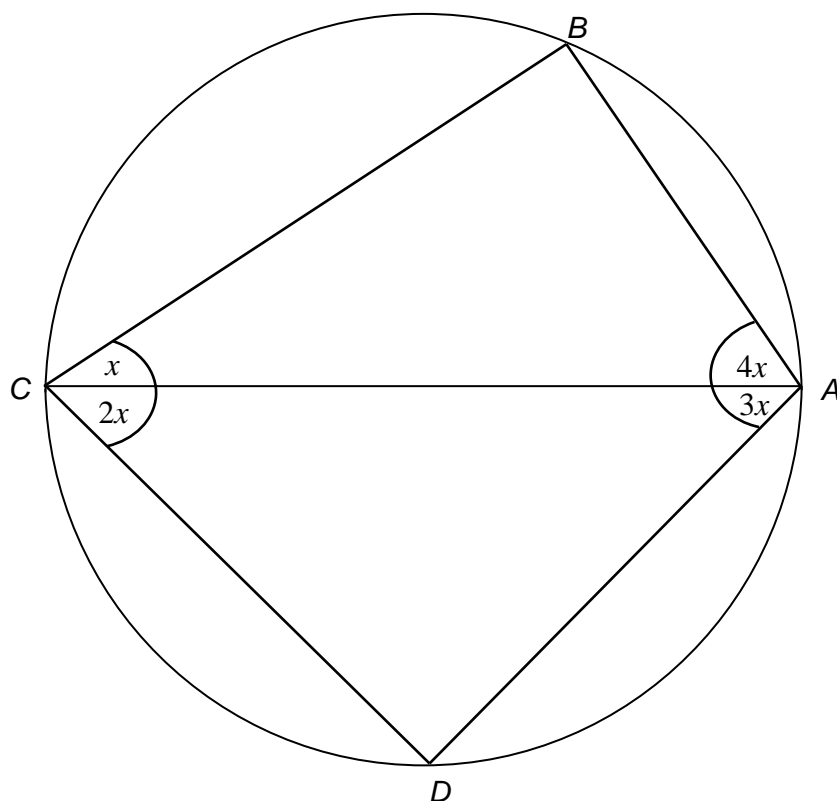
[3 marks]



9

A , B , C and D are points on a circle.

$$\angle BCA = x \quad \angle ACD = 2x \quad \angle CAD = 3x \quad \angle CAB = 4x$$



Not drawn accurately

Prove that AC is a diameter.

[4 marks]

Turn over ►

10 $f(x) = \left(\frac{9x}{2}\right)^{-1}$

$g(x) = \sqrt{1 - px^3}$ where p is a constant.

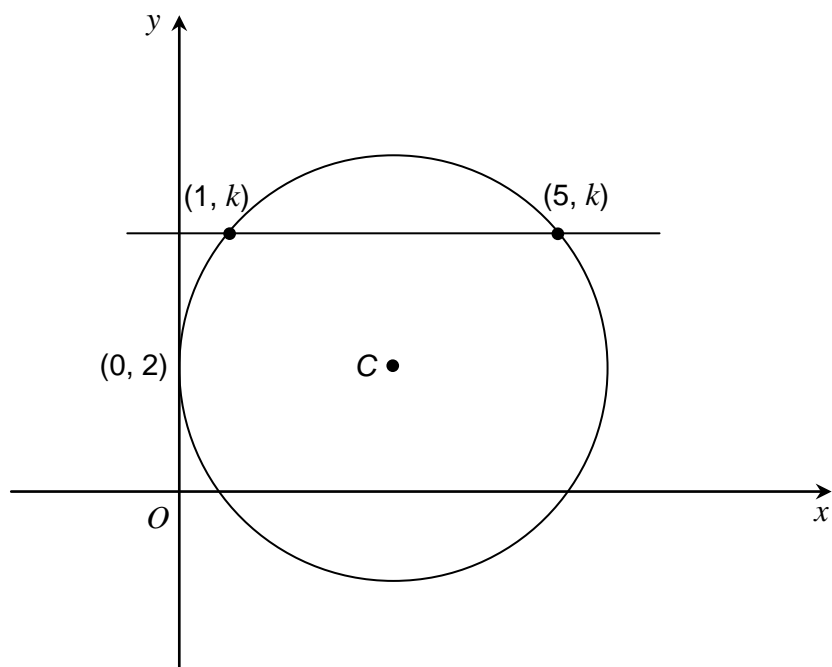
Given that $f\left(\frac{1}{3}\right) = g\left(\frac{1}{3}\right)$ work out the value of p .

[5 marks]

Answer _____

11 A circle, centre C , touches the y -axis at the point $(0, 2)$

The line $y = k$ intersects the circle at the points $(1, k)$ and $(5, k)$

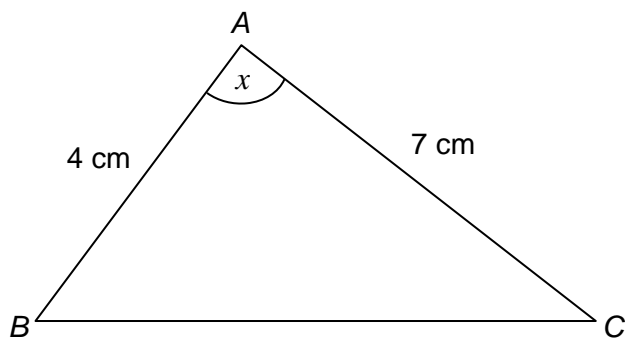


Work out the equation of the circle.

[3 marks]

Answer _____

12 $AB = 4 \text{ cm}$ $AC = 7 \text{ cm}$ $\cos x = -\frac{2}{7}$



Work out the length of BC .

[3 marks]

Answer _____ cm

13 Rearrange $t = \frac{3w^3 + a}{w^3 - 2}$ to make w the subject.

[5 marks]

Answer _____

14 Rationalise and simplify $\frac{\sqrt{3}-7}{\sqrt{3}+1}$

Give your answer in the form $a+b\sqrt{3}$ where a and b are integers.

[4 marks]

Answer _____

15 (b) The normal at A also intersects the curve at B .

Work out the x -coordinate of B .

[4 marks]

Answer _____

16 The coefficient of the x^4 term in the expansion of $(2x + a)^6$ is 60

Work out the possible values of a .

[4 marks]

Answer _____

20 (a) Show that $2\cos^2\theta \equiv 2 - 2\sin^2\theta$

[1 mark]

20 (b) Hence, solve $2\cos^2\theta + 3\sin\theta = 3$ for $0 < \theta < 180^\circ$

[4 marks]

Answer _____

END OF QUESTIONS

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