AQA

Practice Paper A

GCSE
Mathematics

H

Higher   Paper 3   Calculator
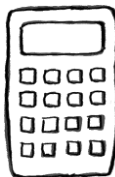
Summer 2019   Time allowed: 1 hour 30 minutes

Materials
For this paper you must have:
- a calculator
- mathematical instruments.

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- 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.
- 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 the answer book.

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

For Examiner's Use	
Pages	Mark
3	
4 - 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
22 – 23	
24 – 25	
26 – 27	
TOTAL	

Teacher	Class

8300/MissB/3H

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Practice Paper Overview

Q	Topic	Mark	Total
1	Angles in Polygons	1	
2	Algebraic Factors	1	
3	Factorise and Solve	1	
4	Congruence	2	
5	Percentage Change	2	
6	Scatter Graph	4	
7	Quadratic Graph	7	
8	Compound Interest	5	
9	Product of Prime Factors	3	
10	Sine Rule MCQ	1	
11	Pie Chart	4	
12	Angles on Parallel Lines	3	
13	Form and Solve Inequalities	3	
14	Reverse Averages	3	
15	Direct Proportion	2	
16	Combined Transformations	4	
17	Algebraic Ratio	4	
18	Circle Theorem MCQ	1	
19	Perpendicular Lines	3	
20	Probability Problem	4	
21	Quadratic Formula	5	
22	Iteration	3	
23	Rearranging Equations	3	
24	3D Pythagoras	4	
25	Cosine Rule	3	
26	Algebraic Fractions	4	
	Total		**80**

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

1 A shape has an interior angle of 120°.

How many sides does the shape have?

[1 mark]

$\qquad$ 2 $\qquad$ 3 $\qquad$ 6 $\qquad$ 15

2 Circle the Highest Common Factor (HCF) of $12xy^3$ and $18x^3y^9$

[1 mark]

$2xy^3 \qquad 3x^3y^9 \qquad 3x^3y \qquad 6xy^3 \qquad 6x^3y^9 \qquad 36xy^9$

3 Circle the solutions to $x^2 - 5x - 24 = 0$

[1 mark]

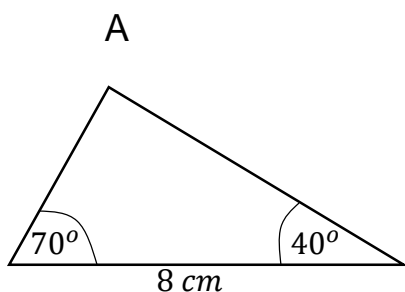$x = -6$ and $x = 4$ $\qquad\qquad$ $x = -4$ and $x = 6$

$x = -3$ and $x = 8$ $\qquad\qquad$ $x = -8$ and $x = 3$

3

4 Here are four triangles

Not drawn accurately

A

B

C

D
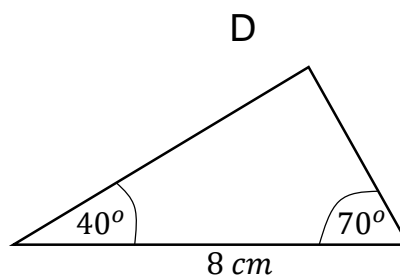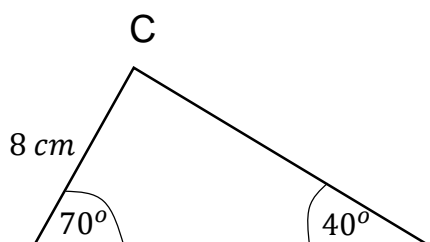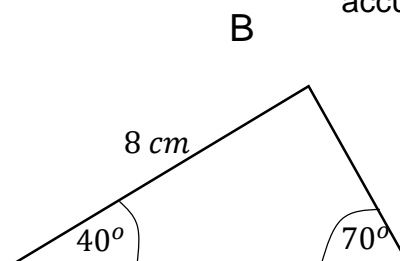
4 (a) Which two triangles are congruent? Circle your answers.

[1 mark]

A   B   C   D

4 (b) Circle the reason for your answer to part (a).

[1 mark]

SSS   ASA   SAS   RHS

2

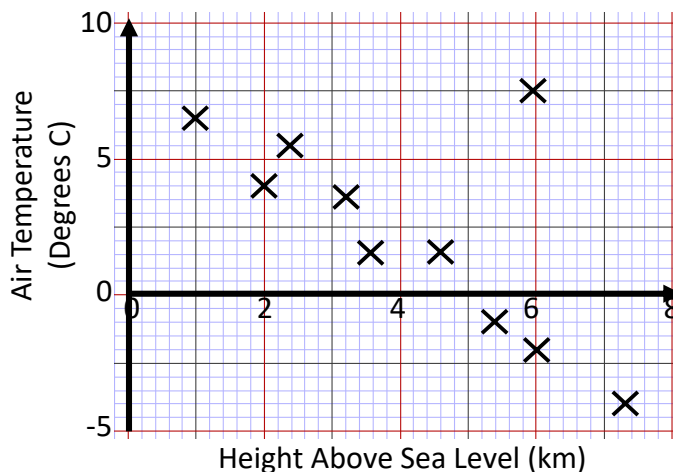**5**   Paul buys a laptop from PC World for £529.

A year later it is worth £444.36.

Calculate the percentage decrease in the price.

[2 marks]

Answer _____

6   Below is a scatter graph showing the air temperature and the height above sea level.

Height Above Sea Level (km)

6 (a)   Describe the correlation between the air temperature and the height above sea level.   **[1 mark]**

6 (b)   Circle and write down the coordinates of the outlier.

[1 mark]

Answer _____

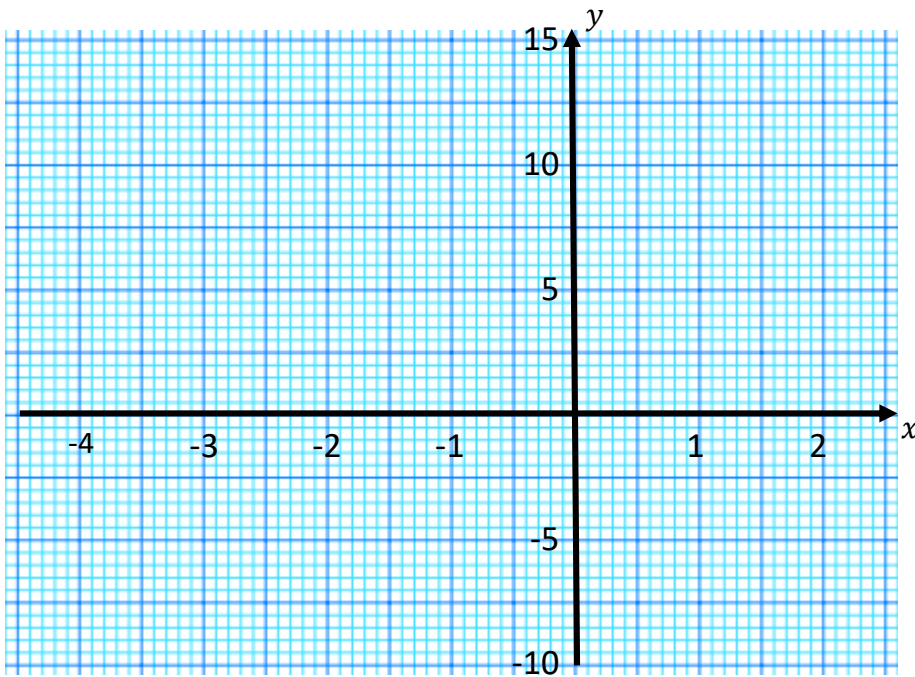**6 (c)**   Find an estimate of the height above sea level when the air temperature is -3^oC.   **[2 marks]**

Answer _____

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6

7 (a) Complete the table of values for $y = x^2 + 4x - 3$. **[2 marks]**

x	-4	-3	-2	-1	0	1	2
y	-3		-7	-6		2	

7 (b) On the gird, draw the graph of $y = x^2 + 4x - 3$.

[2 marks]

7 (c) Circle the coordinates of the turning point of the curve.

[1 mark]

$(0\,,-3)$ $(-2\,,-7)$ $(-2,1)$ $(2,-7)$ $(4,-3)$

7 (d) Use the graph to find approximate solutions to $x^2 + 4x - 3 = -5$

[2 marks]

_____

_____

$x = $ _____ $x = $ _____

7

8 The value of a new house £V is given by

$$V = 160\,000 \times 1.014^t$$

where t is the age of house in complete years.

8 (a) Write down the value of V when $t = 0$.

[1 mark]

Answer

8 (b) What is the value of V after 3 years?

[2 marks]

Answer

8 (c) After how many complete years will the house's value rise above £180 000?
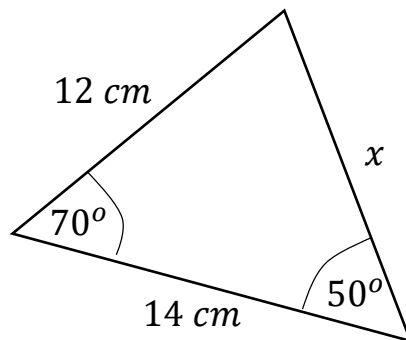
[2 marks]

Answer

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5

9 Express 1176 as a product of its prime factors in index form. **[3 marks]**

Answer

10 Which equations gives the missing length, x, of this triangle?

$12\ cm$

x

70°

$14\ cm$

50°
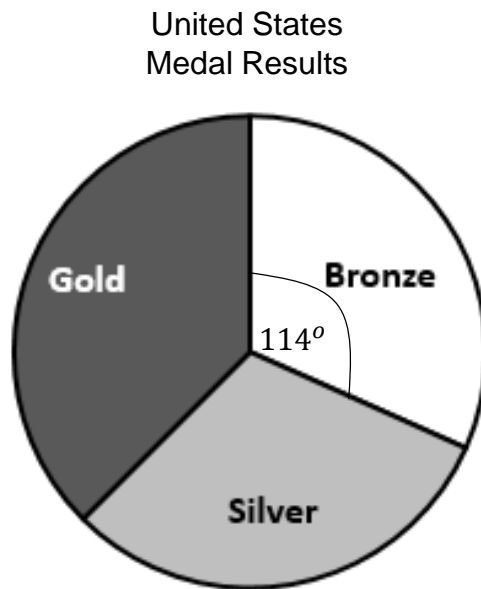
Circle your answer.

[1 mark]

$$\frac{x}{\sin(50)} = \frac{12}{\sin(70)}$$

$$\frac{x}{\sin(50)} = \frac{12}{\sin(14)}$$

$$\frac{x}{\sin(70)} = \frac{12}{\sin(50)}$$

$$\frac{x}{\sin(70)} = \frac{14}{\sin(70)}$$

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11 The pie chart shows some information about the medals the

United States received at the Rio Olympics in 2016.

United States
Medal Results

Diagram not

drawn accurately

Gold

Bronze

114°

Silver

The angle for gold would be 24° more than the angle for Silver.

There were 120 medals in total.

Work out the number of silver medals.

[4 marks]

Answer_____

4

12 AB and CD are parallel to each other.

A   *B*   Diagram not

drawn accurately

x

48⁰

42⁰   *C*

D

Find the size of angle x.

Give reasons for your answer.

[3 marks]

Answer

3

13 Here is a cuboid.

All measurements are in centimetres.

x is an integer.

The total volume of the cuboid is less than 1200 cm^3

Show that $x < 5$

[3 marks]

Answer_____

3

14 Five integers have

a mode of 7

a median of 8

a mean of 9.

What is the greatest possible range of the five integers?

You must show your working.

[3 marks]

Answer_____

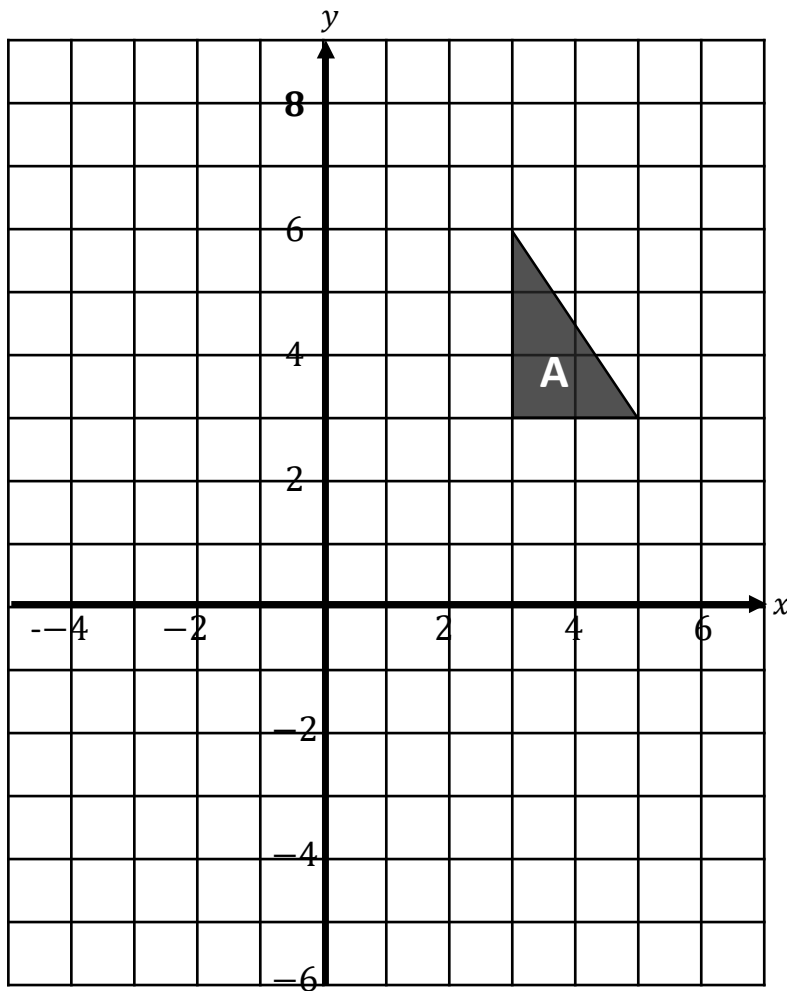**15** y is directly proportional to the square of x.

x	2	3	b
y	a	36	100

Work out the value of a and b.

[2 marks]

$a =$ _____ $b =$ _____

5

16

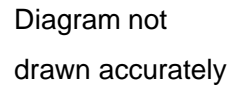Triangle **A** is drawn on a coordinate grid.

The triangle **A** is reflected in the line $x = 1$ and

then enlarged by a scale factor of -1 from the centre $(1, 2)$ to give triangle **B**.

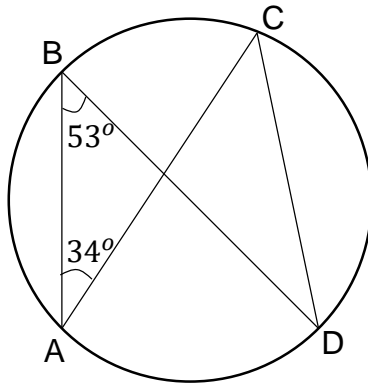Describe fully the single transformation which maps triangle **A** onto triangle **B**.

[4 mark]

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4

17 Below is a cylinder. **[1 mark]**

Diagram not

drawn accurately

$r : l = 1 : 3$

Write an expression in terms of h, for the volume of the cylinder.

[4 marks]

Answer_____

4

18

Not drawn accurately

Circle the size of angle ACD.

[1 mark]

34° 53° 68° 106° 146°

19 Write down the equation of the line that is perpendicular to

$y = \frac{x}{2} + 5$ and passes through $(7, 1)$.

[3 marks]

Answer _____

4

20 A bag contains counters that are purple, yellow, blue and white.

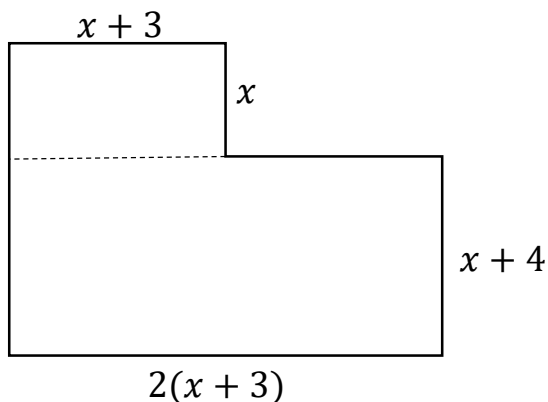| Counter	Purple	Yellow	Blue	White
Frequency	22	$2x$	$x + 5$	$3x + 7$

A counter is chosen at random.

The probability the counter is purple is $\frac{11}{50}$.

Work out the probability it is white.

[4 marks]

Answer _____

4

21 The diagram below shows a 6-sided shape.

All the corners are right angles.

All the measurements are given in centimetres.

$x + 3$

x

$x + 4$

$2(x + 3)$

The area of the shape is $40 \ cm^2$.

21 (a) Show that $3x^2 + 17x - 16 = 0$ **[2 marks]**

21 (b) Solve the equation

$$3x^2 + 17x - 16 = 0$$ **[3 marks]**

Give your solutions correct to 3 significant figures.

$x = $ _____ $x = $ _____

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5

22 An approximate solution to the equation $x^3 - 6x + 3 = 0$ is found using this iterative process.

$$x_{n+1} = \frac{(3 - x_n^3)}{6}$$

Use this iterative process to find a solution to 3 decimal places of

$$x^3 - 6x + 3 = 0$$

Start with the value $x_1 = 2$
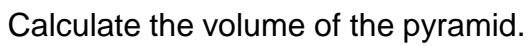
[3 marks]

Answer_____

23 Rearrange

$$y = \frac{wx - 5}{w - 4x}$$

to make x the subject.

[3 marks]

Answer_____

6

24 ABCDE is a square-based pyramid.

The apex of the pyramid, E, is directly over the centre of the base.

Calculate the volume of the pyramid.

Give your answer correct to 1 decimal place. **[4 marks]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer_____

4

25
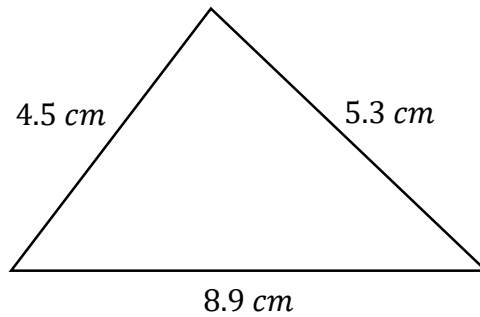
4.5 cm 5.3 cm

8.9 cm

The lengths of the sides of a triangle are 4.5 $cm,$ 5.3 cm and 8.9 cm.

Calculate the size of the largest angle of the triangle.

Give your answer correct to 1 decimal place. **[3 marks]**

Answer _____

26 Simplify fully

$$\frac{x^2 + 7x + 12}{4x - 2} \div \frac{x + 4}{2}$$

[4 marks]

Answer _____

End of Questions

7