UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2013**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 70.

This document consists of **11** printed pages and **1** blank page.

1 Work out 72 cents as a percentage of 83 cents.

Answer ..... % [1]

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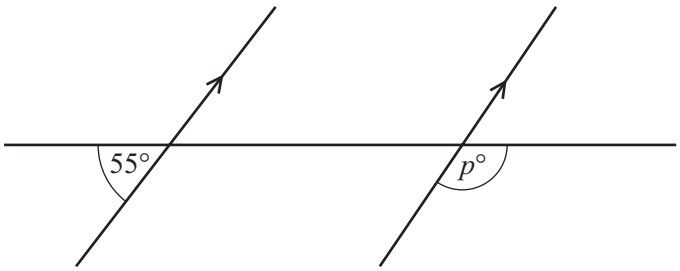
2 Calculate $\dfrac{5.27 - 0.93}{4.89 - 4.07}$.

Give your answer correct to 4 significant figures.

Answer ..... [2]

3



NOT TO SCALE

Find the value of p.

Answer $p =$ ..... [2]

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4 Calculate 17.5% of 44 kg.

Answer ..... kg [2]

For Examiner's Use

5 Solve the equation.

$$5 - 2x = 3x - 19$$

Answer $x =$ ..... [2]

6

S	P	A	C	E	S

One of the 6 letters is taken at random.

(a) Write down the probability that the letter is S.

Answer(a) ..... [1]

(b) The letter is replaced and again a letter is taken at random.
This is repeated 600 times.

How many times would you expect the letter to be S?

Answer(b) ..... [1]

---

7 The length, p cm, of a car is 440 cm, correct to the nearest 10 cm.

Complete the statement about p.

Answer ..... $\leqslant p <$ ..... [2]

[Turn over

For Examiner's Use

8 Emily invests \$$x$ at a rate of 3% per year simple interest.
After 5 years she has \$20.10 interest.

Find the value of x.

Answer $x =$ ..... [3]

---

9 Find the nth term in each of the following sequences.

(a) $\frac{1}{3}, \quad \frac{2}{4}, \quad \frac{3}{5}, \quad \frac{4}{6}, \quad \frac{5}{7}, \quad .....$

Answer(a) ..... [1]

(b) 0, 3, 8, 15, 24, ...

Answer(b) ..... [2]

---

10 Make b the subject of the formula.

$$c = \sqrt{a^2 + b^2}$$

Answer $b =$ ..... [3]

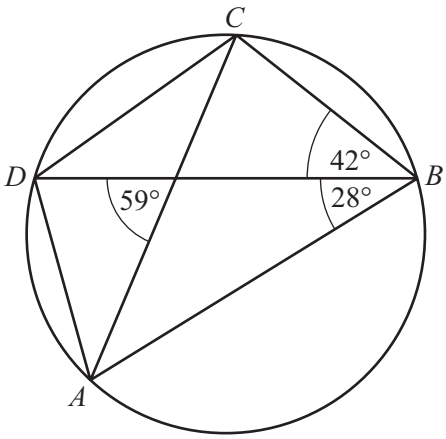
---

11 The volume of a child's model plane is 1200 cm^3.
The volume of the full size plane is 4050 m^3.

Find the scale of the model in the form $1 : n$.

Answer $1 :$ ..... [3]

12



NOT TO SCALE

A, *B*, *C* and *D* lie on the circle.

Find

(a) angle *ADC*,

Answer(a) Angle *ADC* = ... [1]

(b) angle *ADB*.

Answer(b) Angle *ADB* = ... [2]

---

13 **(a)** $3^x = \sqrt[4]{3^5}$

Find the value of x.

Answer(a) x = ... [1]

(b) Simplify $(32y^{15})^{\frac{2}{5}}$.

Answer(b) ..... [2]

---

14 Write as a single fraction in its simplest form.

$$3 - \frac{t+2}{t-1}$$

Answer ..... [3]

---

15 Do not use a calculator in this question and show all the steps of your working.

Give each answer as a fraction in its lowest terms.

Work out.

(a) $\frac{3}{4} - \frac{1}{12}$

Answer(a) ..... [2]

(b) $2\frac{1}{2} \times \frac{4}{25}$

Answer(b) ..... [2]

16

A is the point (–1, 1) and B is the point (8, 7).

(a) Write $\overrightarrow{AB}$ as a column vector.

Answer(a) $\overrightarrow{AB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) Find $|\overrightarrow{AB}|$.

Answer(b) $|\overrightarrow{AB}| =$ ..... [2]

(c) $\overrightarrow{AC} = 2\overrightarrow{AB}$.

Write down the co-ordinates of C.

Answer(c) (..... , ...) [1]

---

17 Factorise completely.

(a) $a + b + at + bt$

Answer(a) ..... [2]

(b) $x^2 - 2x - 24$

Answer(b) ..... [2]

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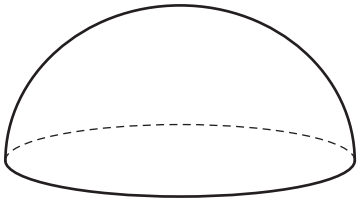
18 The diagram shows a solid hemisphere.



The **total** surface area of this hemisphere is 243π.
The volume of the hemisphere is $k\pi$.

Find the value of k.

[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]
[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

Answer $k =$ ..... [4]

---

19 **(a)** Convert 144 km/h into metres per second.

Answer(a) ..... m/s [2]

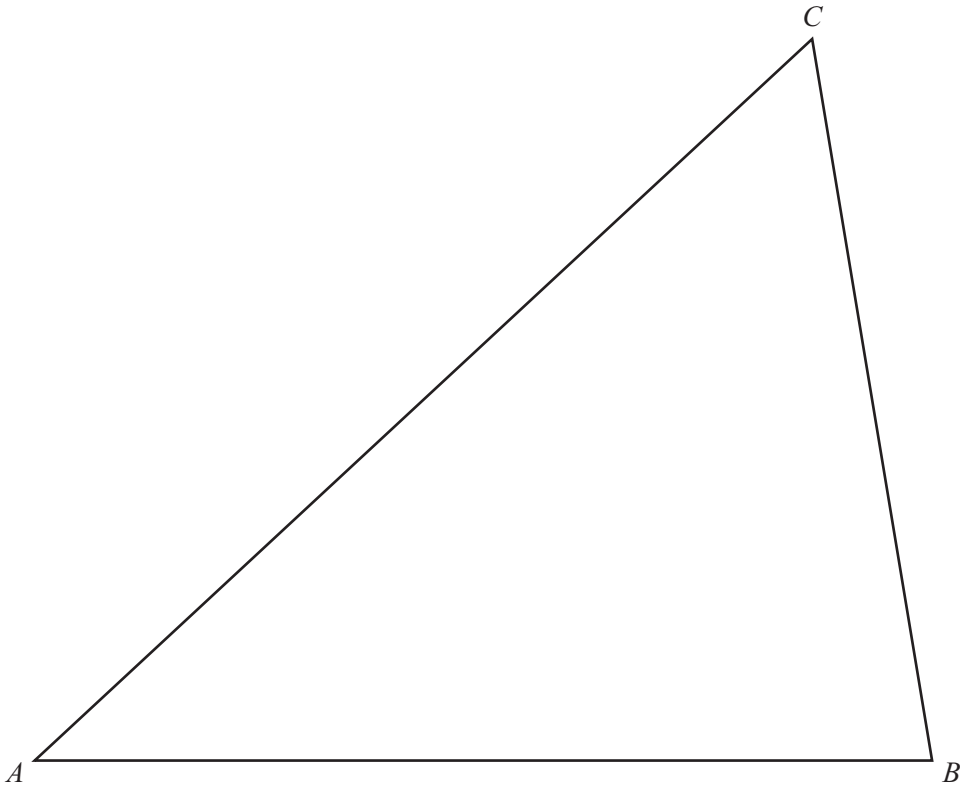
(b) A train of length 120 m is travelling at 144 km/h.
It passes under a bridge of width 20 m.

Find the time taken for the whole train to pass under the bridge.
Give your answer in seconds.

Answer(b) ..... s [2]

20

For Examiner's Use



(a) In this part, use a straight edge and compasses only and show your construction arcs.

Construct accurately

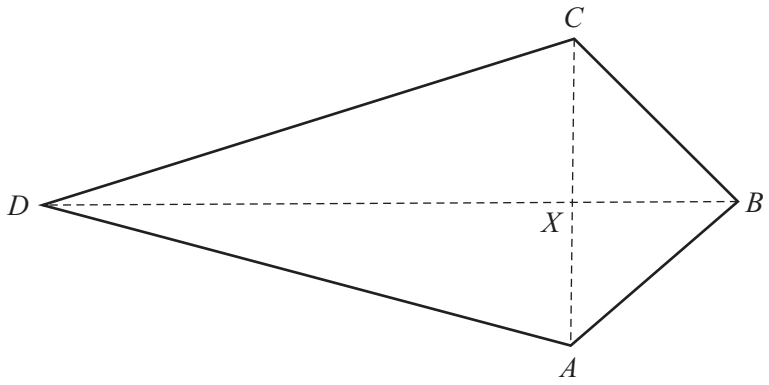
(i) the bisector of angle B, [2]

(ii) the locus of points equidistant from B and from C. [2]

(b) Shade the region inside triangle ABC containing the points which are

nearer to BC than to BA **and** nearer to C than to B. [1]

21



NOT TO SCALE

ABCD is a kite.
The diagonals *AC* and *BD* intersect at *X*.
AC = 12 cm, *BD* = 20 cm and *DX* : *XB* = 3 : 2 .

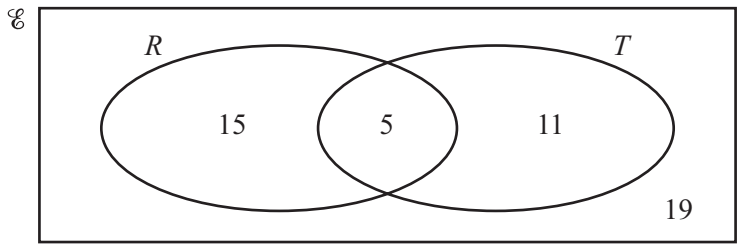
(a) Calculate angle *ABC*.

Answer(a) Angle *ABC* = ... [3]

(b) Calculate the area of the kite.

Answer(b) ..... cm^2 [2]

22



The Venn diagram shows the number of red cars and the number of two-door cars in a car park.
There is a total of 50 cars in the car park.
R = {red cars} and T = {two-door cars}.

(a) A car is chosen at random.

Write down the probability that

(i) it is red and it is a two-door car,

Answer(a)(i) ..... [1]

(ii) it is not red and it is a two-door car.

Answer(a)(ii) ..... [1]

(b) A two-door car is chosen at random.

Write down the probability that it is not red.

Answer(b) ..... [1]

(c) Two cars are chosen at random.

Find the probability that they are both red.

Answer(c) ..... [2]

(d) On the Venn diagram, shade the region $R \cup T'$. [1]

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