Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8383126027

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2018**

1 hour 30 minutes

Candidates answer on the Question Paper.

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

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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.

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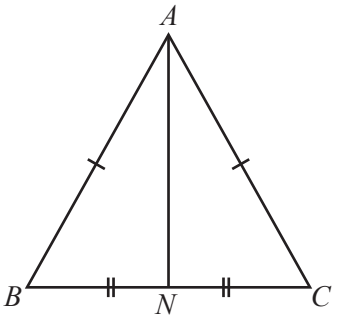
1 Carlos starts work at 21 20 and finishes at 06 15 the next day.

Calculate how long Carlos is at work.

..... h ..... min [1]

2



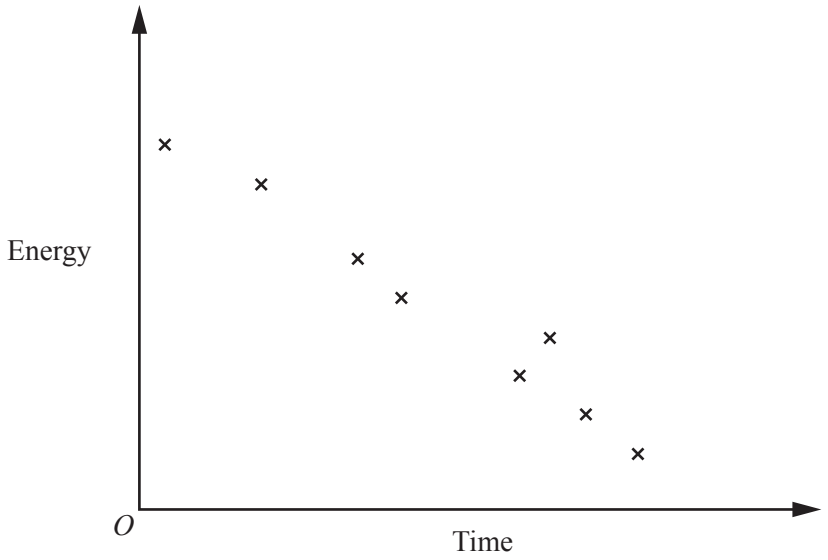
NOT TO SCALE

In the diagram, $AB = AC$ and $BN = NC$.

Complete the statement using a mathematical term.

Triangle ABN is ..... to triangle ACN. [1]

3



What type of correlation does the scatter diagram show?

.....[1]

4 Work out $(6.4 \times 10^7) + (9.6 \times 10^6)$.
Give your answer in standard form.

.....[2]

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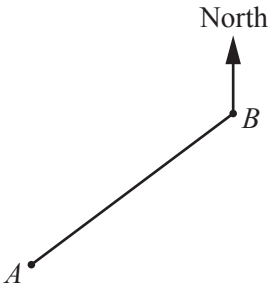
5 Expand and simplify.

$$(3x-7)(2x+9)$$

..... [2]

6



NOT TO SCALE

The bearing of A from B is 227°.

Find the bearing of B from A.

..... [2]

7 y is inversely proportional to x^3.
When $x = 2$, $y = 0.5$.

Find y in terms of x.

$y =$ ..... [2]

8 Saafia has a barrel containing 6000 millilitres of oil, correct to the nearest 100 ml.
She uses the oil to fill bottles which each hold exactly 50 ml.

Calculate the upper bound for the number of bottles she can fill.

..... [2]

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9 Jan invests \$800 at a rate of 3% per year simple interest.

Calculate the value of her investment at the end of 4 years.

\$ ..... [3]

10 A water tank in the shape of a cuboid has length 1.5 metres and width 1 metre.
The water in the tank is 60 centimetres deep.

Calculate the number of litres of water in the tank.

..... litres [3]

11 These are the first five terms in a sequence.

8 11 14 17 20

(a) Find the next term.

..... [1]

(b) Find an expression for the nth term.

..... [2]

12 Find the integer values of n that satisfy the inequality $15 \leqslant 4n < 28$.

..... [3]

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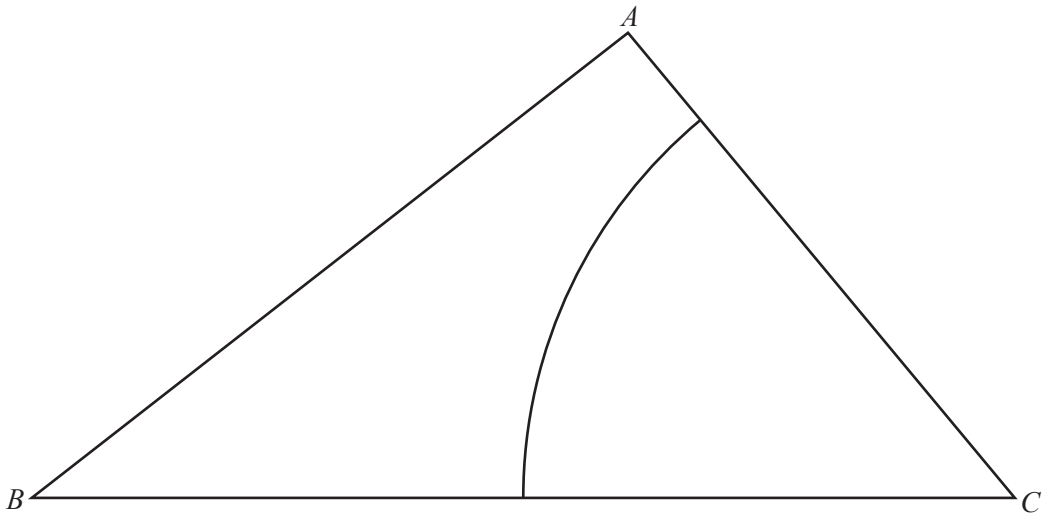
13



The diagram shows a triangle ABC and an arc with centre C and radius 6.5 cm.

(a) **Using a straight edge and compasses only**, construct the locus of points inside the triangle that are equidistant from BA and BC. [2]

(b) Shade the region inside the triangle that is

- more than 6.5 cm from C

and

- nearer to BA than to BC. [1]

14 **Without using your calculator**, work out $\frac{3}{8} \div 2\frac{1}{4}$.

You must show all your working and give your answer as a fraction in its simplest form.

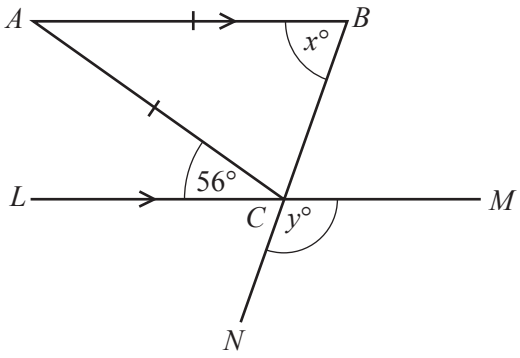
..... [3]

15 Write as a single fraction in its simplest form.

$$\frac{x-5}{3}+\frac{6}{x+2}$$

..... [3]

16



NOT TO SCALE

The diagram shows an isosceles triangle ABC with $AB = AC$.
LCM and BCN are straight lines and LCM is parallel to AB.
Angle $ACL = 56°$.

Find the value of x and the value of y.

$x =$ .....

$y =$ ..... [4]

17 **(a)** $t^x \times t^2 = t^{10}$

Find the value of x.

$x =$ ..... [1]

(b) Simplify.

(i) $\left(\frac{4}{x}\right)^{-2}$

..... [1]

(ii) $a^3b^7 \div a^6b^2$

..... [2]

18 Solve the simultaneous equations.
You must show all your working.

$$2x + 3y = -12$$
$$5x + 2y = 14$$

$x =$ .....

$y =$ ..... [4]

19 Use the quadratic formula to solve the equation $3x^2 + 7x - 11 = 0$.
You must show all your working and give your answers correct to 2 decimal places.

$x =$ ..... or $x =$ ..... [4]

20 $\mathbf{M} = \begin{pmatrix} 8 & 2 \\ 7 & 3 \end{pmatrix}$ $\mathbf{N} = \begin{pmatrix} 4 & -1 \\ -3 & 5 \end{pmatrix}$

(a) Find **MN**.

$\mathbf{MN} =$ $\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

(b) Find $\mathbf{M}^{-1}$.

$\mathbf{M}^{-1} =$ $\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

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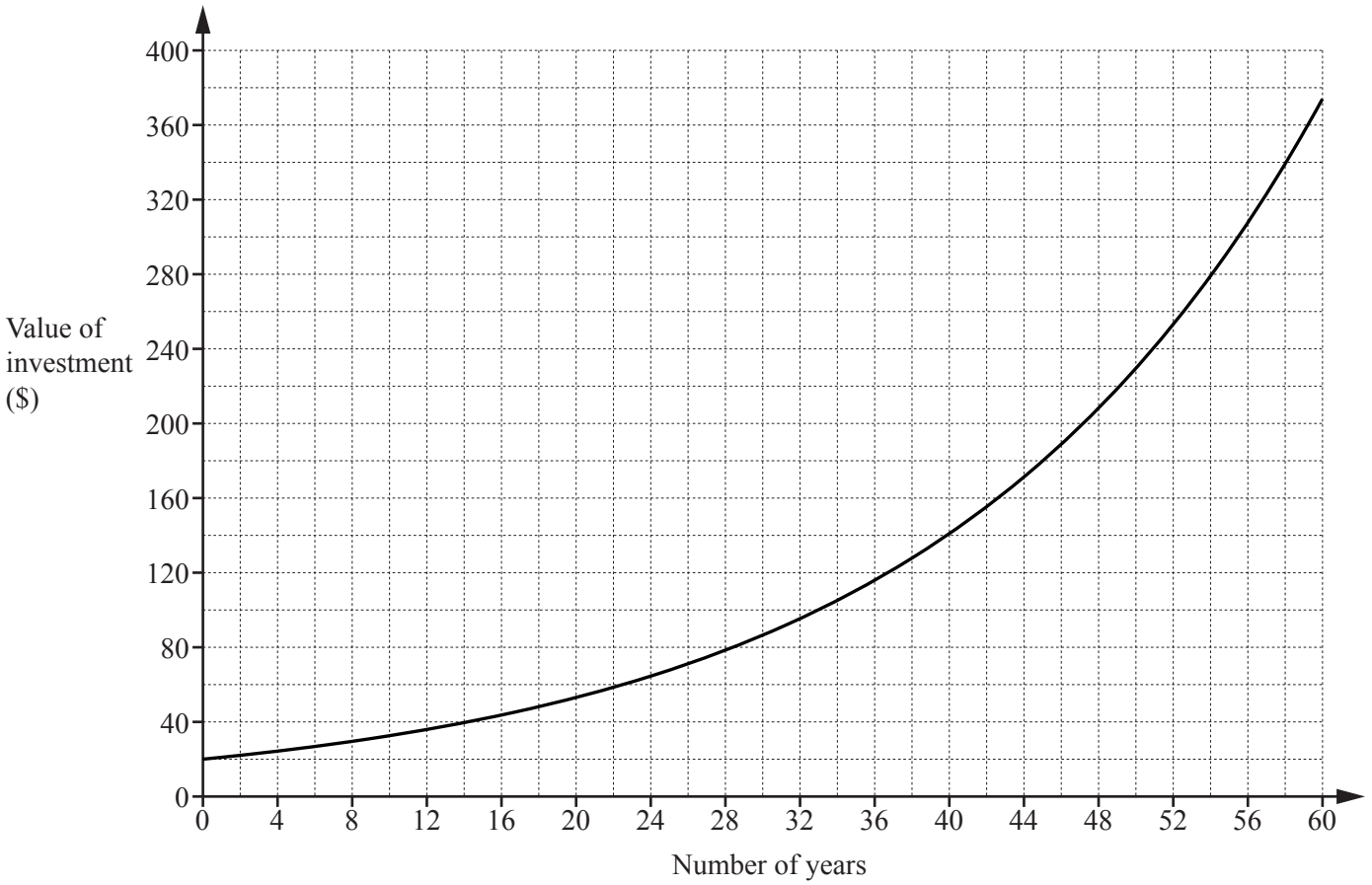
21



When Heidi was born, her grandfather invested some money in an account that paid compound interest. The graph shows the exponential growth of this investment.

(a) Use the graph to find

(i) the original amount of money invested,

$ ..... [1]

(ii) the number of years it took for the original amount to double,

..... years [1]

(iii) the value of the investment after 54 years.

$ ..... [1]

(b) This account earned compound interest at a rate of r% per year.

Use your answers to **part (a)(i)** and **part (a)(ii)** to write down an equation in terms of r.
You do not have to solve your equation.

..... [2]

22 A group of 200 people were asked which city they would like to visit next.
The table shows the results.

City	London	Paris	New York	Tokyo
Number of people	50	48	56	46

(a) A person from the group is chosen at random.

Write down the probability that this person would like to visit either Paris or Tokyo next.

..... [2]

(b) Two people are chosen at random from the group of 200.

Find the probability that one person would like to visit London next and the other person would like to visit New York next.
Give your answer as a percentage.

..... % [3]

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23 $f(x) = 7 + 3x$ $g(x) = x^4$ $h(x) = 3^x$

(a) $h(3x) = k^x$

Find the value of k.

$k =$ ..... [2]

(b) Find the value of x when $f(x) = g(2)$.

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

(c) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

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