Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTER NUMBER						CANDIDATE NUMBER				

0566126055

MATHEMATICS (US) **0444/21**

Paper 2 (Extended) **May/June 2020**

1 hour 30 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, center number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary work clearly.
- All answers should be given in their simplest form.

INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in parentheses [ ].

This document has **16** pages. Blank pages are indicated.

[Turn over

Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Lateral surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

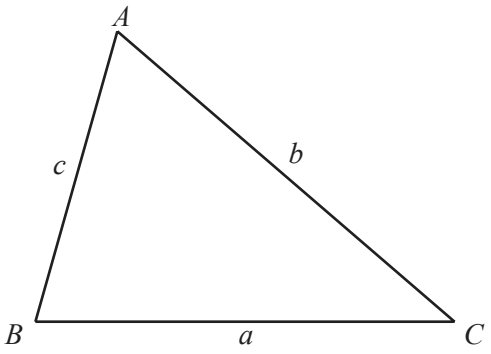
Lateral surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

Surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$

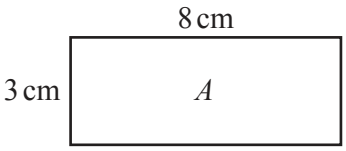


$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

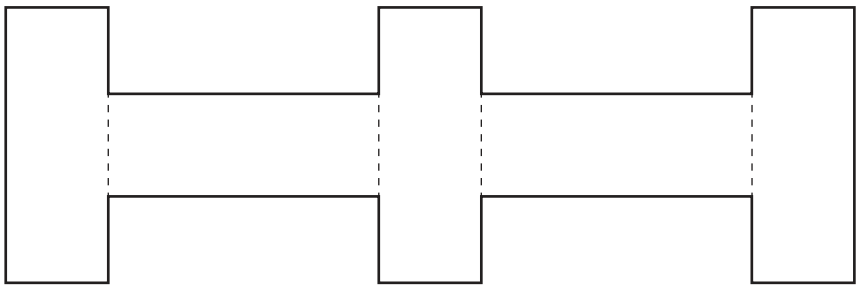
$$\text{Area} = \frac{1}{2}bc\sin A$$

1 Rectangle A measures 3 cm by 8 cm.



NOT TO SCALE

Five rectangles congruent to A are joined to make a shape.



NOT TO SCALE

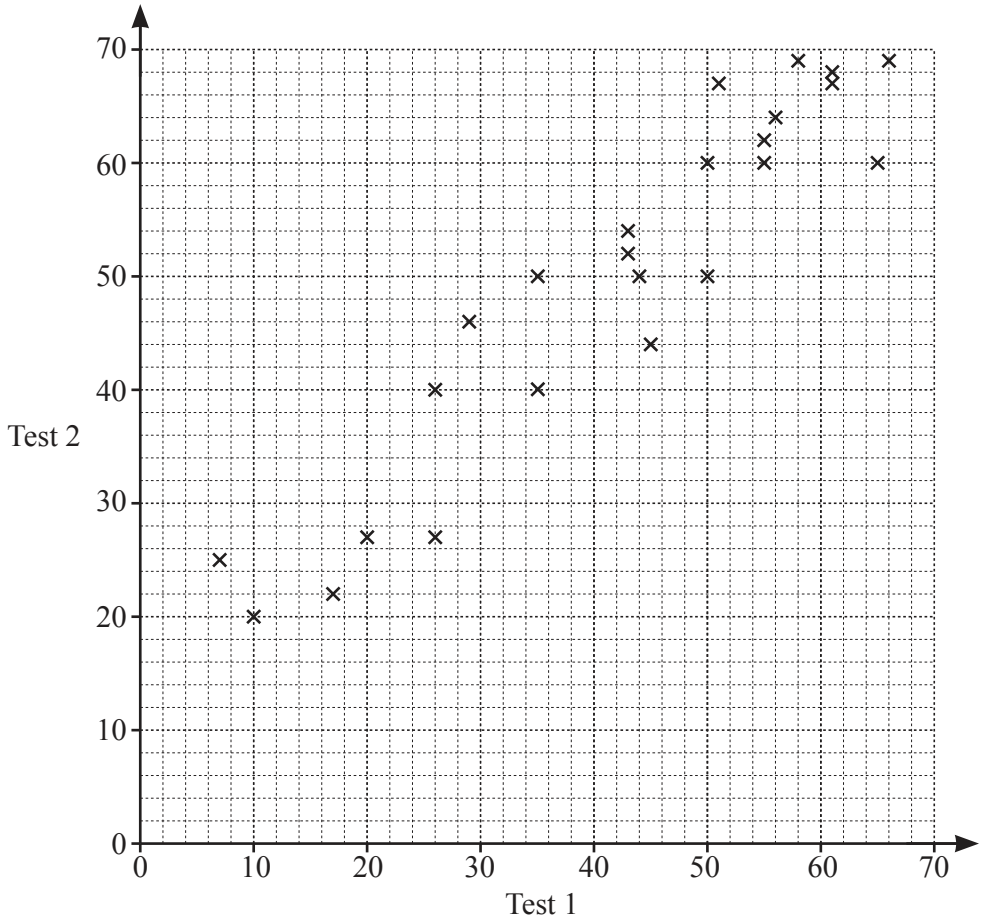
Work out the perimeter of this shape.

..... cm [2]

2 Find the highest **odd** number that is a factor of 60 and a factor of 90.

..... [1]

3 Mrs Salaman gives her class two mathematics tests.
The scatter diagram shows information about the marks each student scored.



(a) Write down the highest mark scored on test 1.

..... [1]

(b) Write down the type of correlation shown in the scatter diagram.

..... [1]

(c) Draw a line of best fit on the scatter diagram. [1]

(d) Hamish scored a mark of 40 on test 1.
He was absent for test 2.

Use your line of best fit to find an estimate for his mark on test 2.

..... [1]

4 A bag contains blue, red, yellow, and green balls only.
A ball is taken from the bag at random.
The table shows some information about the probabilities.

Color	Blue	Red	Yellow	Green
Probability	0.15	0.2		0.43

(a) Complete the table.

[2]

(b) Abdul takes a ball at random and replaces it in the bag.
He does this 200 times.

Find how many times he expects to take a red ball.

..... [1]

5 **(a)** The nth term of a sequence is $60 - 8n$.

Find the largest number in this sequence.

..... [1]

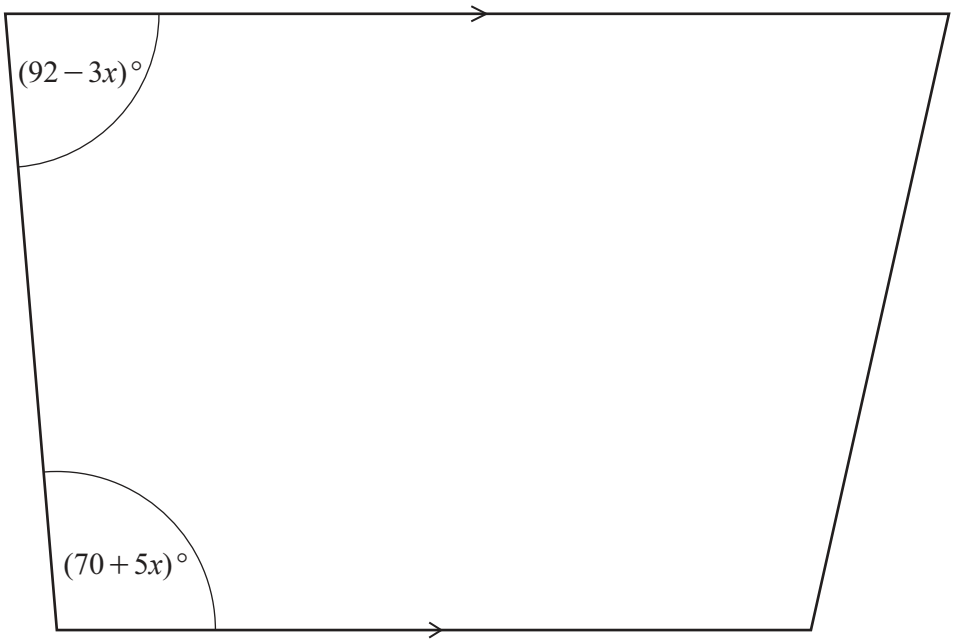
(b) Here are the first five terms of a different sequence.

12 19 26 33 40

Find an expression for the nth term of this sequence.

..... [2]

6 The diagram shows a trapezoid.



NOT TO SCALE

Work out the value of x.

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

7 $234 = 2 \times 3^2 \times 13$ $1872 = 2^4 \times 3^2 \times 13$ $234 \times 1872 = 438\,048$

Use this information to write 438 048 as a product of its prime factors.

..... [1]

8 Work out $\left(2\frac{1}{3}-\frac{7}{8}\right)\times\frac{6}{25}$.

Give your answer as a fraction in its simplest form.

..... [4]

9 Factor completely.

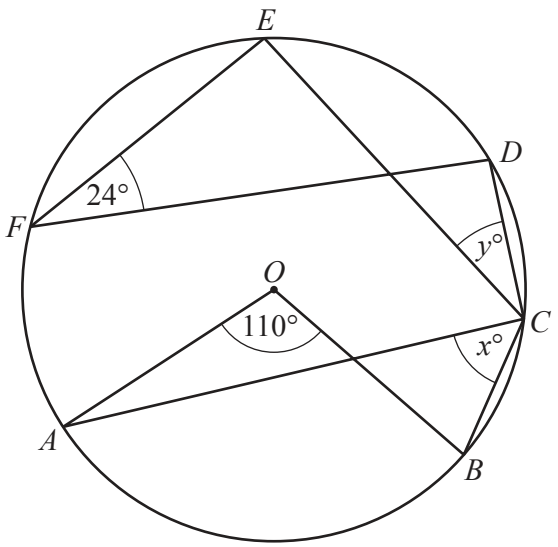
(a) $21a^2+28ab$

..... [2]

(b) $20x^2-45y^2$

..... [3]

10



NOT TO SCALE

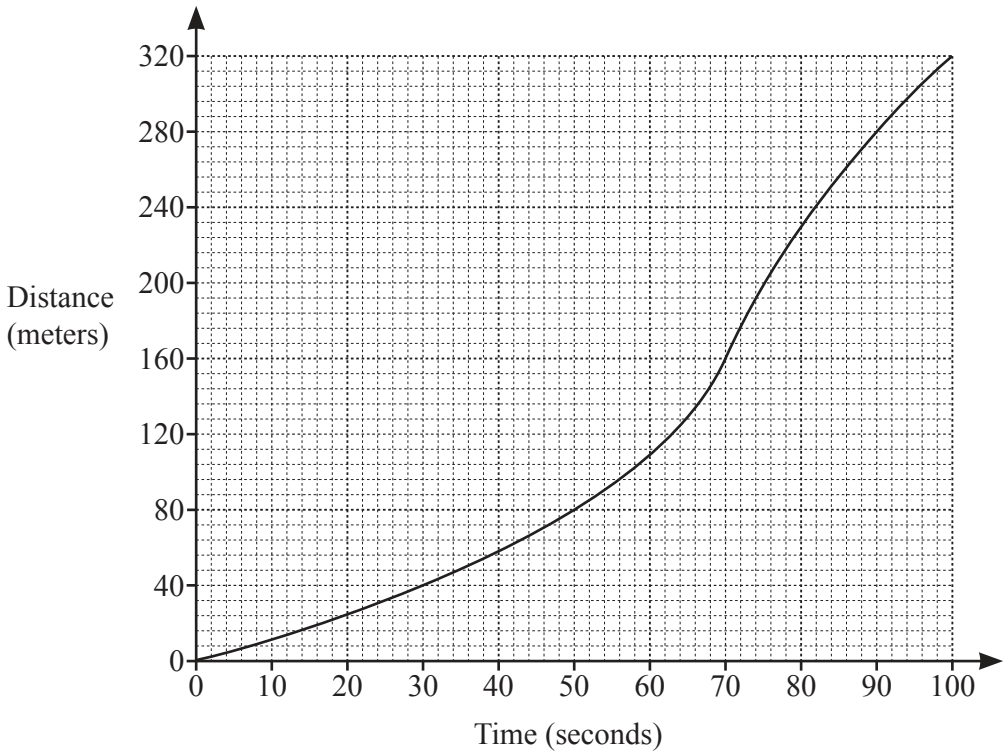
Points A, B, C, D, E and F lie on the circle, center O.

Find the value of x and the value of y.

$x =$ .....

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

11



The diagram shows the distance traveled by a cyclist during the first 100 seconds of her journey.

(a) Work out her average speed.

..... m/s [1]

(b) Find an estimate of the speed of the cyclist 60 seconds after she started.

..... m/s [3]

12 19 11 13 10 12 19 14 15 19 13

The list shows 10 test scores.

Find

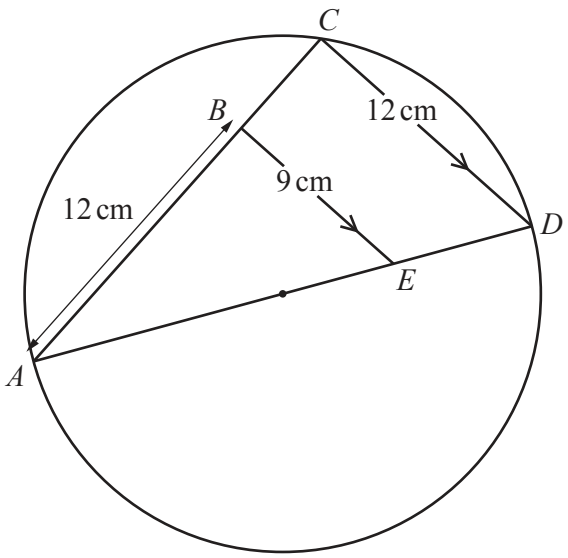
(a) the mode,

..... [1]

(b) the median.

..... [2]

13



NOT TO SCALE

C lies on a circle with diameter AD.
B lies on AC and E lies on AD such that BE is parallel to CD.
$AB = 12$ cm, $CD = 12$ cm and $BE = 9$ cm.

Work out the radius of the circle.

..... cm [5]

14 **(a)** $f(x) = 4x + 3$ $g(x) = 5x - 4$

$f\big(g(x)\big) = 20x + p$

Find the value of p.

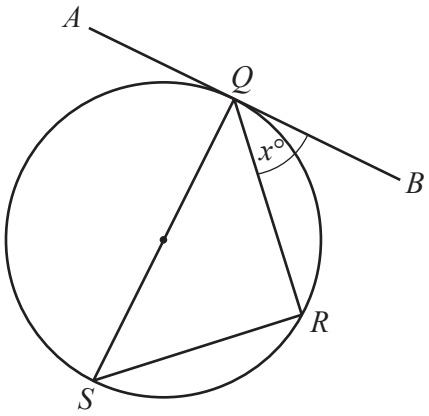
$p =$ ..... [2]

(b) $h(x) = \dfrac{5x - 1}{3}$

Find $h^{-1}(x)$.

$h^{-1}(x) =$ ..... [3]

15



NOT TO SCALE

Q, R and *S* are points on the circle.
QS is a diameter.
AB is a tangent to the circle at *Q*.
Angle $BQR = x°$.

Show that angle $QSR = x°$.
Give a reason for each step of your work.

.....

.....

..... [3]

16 m varies inversely as the square of $(p - 1)$.
When $p = 4$, $m = 5$.

Find m when $p = 2$.

$m =$ ..... [3]

17 (a) (i) $\mathbf{m} = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$

Find $3\mathbf{m}$.

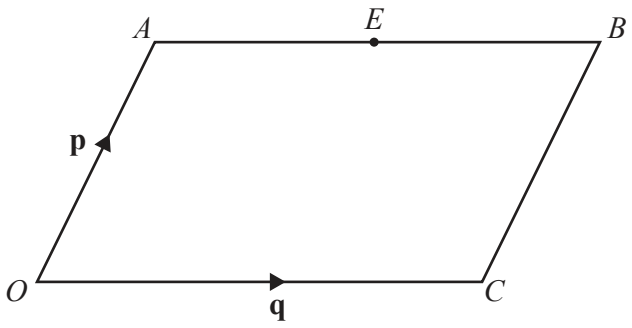
$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) The magnitude of the vector $\begin{pmatrix} p \\ 12 \end{pmatrix}$ is 13.

Find the positive value of p.

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

(b)



NOT TO SCALE

$OABC$ is a parallelogram.
$\overrightarrow{OA} = \mathbf{p}$ and $\overrightarrow{OC} = \mathbf{q}$.
E is the midpoint of AB.

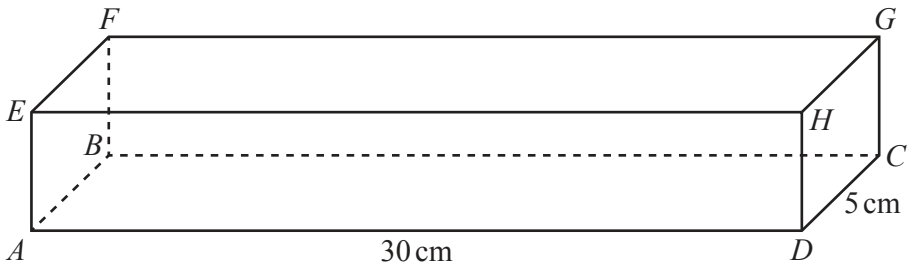
Find $\overrightarrow{OE}$ in terms of $\mathbf{p}$ and $\mathbf{q}$.

$\overrightarrow{OE} =$ ..... [2]

18 Simplify $\sqrt{250} + \sqrt{40}$.

..... [2]

19



NOT TO SCALE

The diagram shows a solid cuboid *ABCDEFGH* of length 30 cm and width 5 cm.
The volume of the cuboid is 600 cm^3.

Find the total surface area of the cuboid.

..... cm^2 [4]

20 Simplify. $\dfrac{x-8-ax+8a}{x^2-15x+56}$

..... [5]

21 The area of a regular hexagon with side length 8 cm is $k\sqrt{3}\,\text{cm}^2$.

Find the value of k.

$k =$ ..... [3]

BLANK PAGE