



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**MATHEMATICS (US)**

**0444/21**

Paper 2 (Extended)

**May/June 2016**

**1 hour 30 minutes**

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

**READ THESE INSTRUCTIONS FIRST**

Write your Center 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.

**CALCULATORS MUST NOT BE USED IN THIS PAPER.**

All answers should be given in their simplest form.

If work is needed for any question it must be shown in the space provided.

The number of points is given in parentheses [ ] at the end of each question or part question.

The total of the points for this paper is 70.

This document consists of **12** printed pages.

## Formula List

For the equation

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Lateral surface area,  $A$ , of cylinder of radius  $r$ , height  $h$ .

$$A = 2\pi rh$$

Lateral surface area,  $A$ , of cone of radius  $r$ , sloping edge  $l$ .

$$A = \pi rl$$

Surface area,  $A$ , of sphere of radius  $r$ .

$$A = 4\pi r^2$$

Volume,  $V$ , of pyramid, base area  $A$ , height  $h$ .

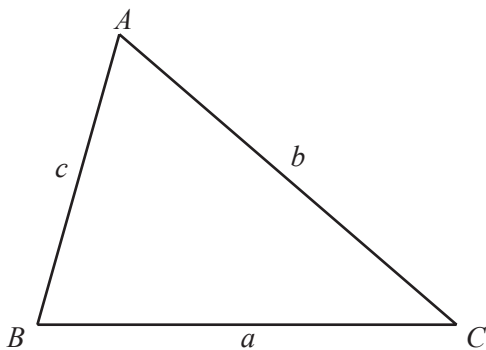
$$V = \frac{1}{3}Ah$$

Volume,  $V$ , of cone of radius  $r$ , height  $h$ .

$$V = \frac{1}{3}\pi r^2 h$$

Volume,  $V$ , of sphere of radius  $r$ .

$$V = \frac{4}{3}\pi r^3$$



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

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

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

- 1 A train leaves Zurich at 22 40 and arrives in Vienna at 07 32 the next day.

Work out the time taken.

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

- 2 From a sample of 25 batteries, 3 are faulty.

Work out the percentage of faulty batteries.

..... % [1]

- 3 Write  $1.27 \times 10^{-3}$  as an ordinary number.

..... [1]

- 4 Work out  $7 + 8 \times 3 - 6 \div 2$ .

..... [2]

- 5 Omar changes 2000 Saudi Arabian riyals (SAR) into dollars when the exchange rate is 1 SAR = \$0.27.

Work out how much Omar receives.

\$ ..... [2]

- 6 Find the least common multiple (LCM) of 36 and 48.

..... [2]

7  $y = mx + b$

Find the value of  $y$  when  $m = -2$ ,  $x = -7$  and  $b = -3$ .

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

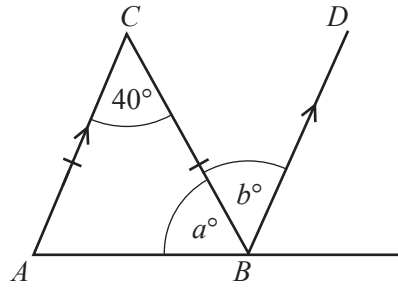
8  $y = \frac{qx}{p}$

Solve for  $x$ .

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

5

9

NOT TO  
SCALE

Triangle  $ABC$  is isosceles and  $AC$  is parallel to  $BD$ .

Find the value of  $a$  and the value of  $b$ .

$a = \dots\dots\dots$

$b = \dots\dots\dots [2]$

10 Solve the system of linear equations.

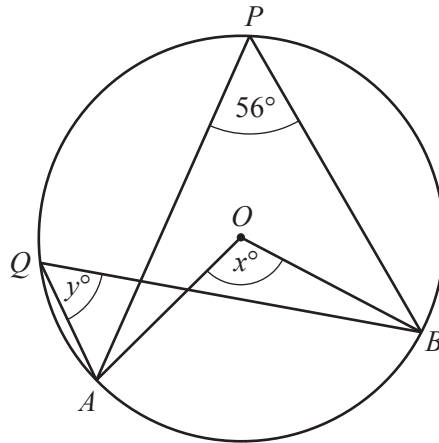
$$2x + y = 3$$

$$3x + y = 1$$

$x = \dots\dots\dots$

$y = \dots\dots\dots [2]$

11



NOT TO SCALE

$A$ ,  $B$ ,  $P$  and  $Q$  lie on the circle, center  $O$ .  
Angle  $APB = 56^\circ$ .

Find the value of

(a)  $x$ ,

$x = \dots\dots\dots$  [1]

(b)  $y$ .

$y = \dots\dots\dots$  [1]

12 Simplify  $(16p^{16})^{\frac{1}{4}}$ .

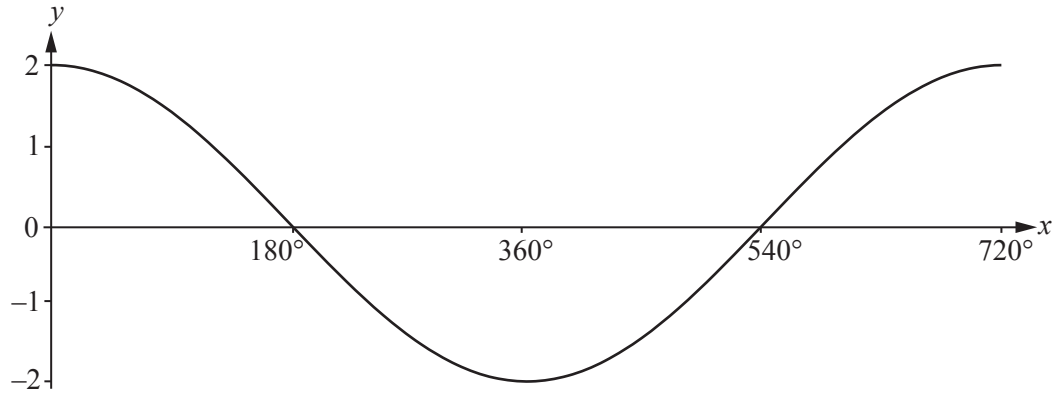
$\dots\dots\dots$  [2]

13 Solve the inequality.

$$n + 7 < 5n - 8$$

$\dots\dots\dots$  [2]

14



The graph of  $y = f(x)$  is shown in the diagram.

Write down the equation of the trigonometric function,  $f(x)$ .

$f(x) = \dots\dots\dots$  [3]

15

7, 5, 3, 1, -1, ...

(a) Find the next term in this sequence.

$\dots\dots\dots$  [1]

(b) Find the  $n$ th term of the sequence.

$\dots\dots\dots$  [2]

16 Work out  $\frac{6}{7} \div 1\frac{2}{3}$ .

Give your answer as a fraction in its lowest terms.

$\dots\dots\dots$  [3]

- 17 Five angles of a hexagon are each  $115^\circ$ .

Calculate the size of the sixth angle.

..... [3]

- 18 A car of length 4 m is traveling at 72 km/h.  
It passes over a bridge of length 36 m.

Calculate the time, in seconds, it takes to pass over the bridge **completely**.

..... s [3]

- 19  $y$  varies directly as the positive square root of  $x$ .  
When  $x = 9$ ,  $y = 12$ .

Find  $y$  when  $x = \frac{1}{4}$ .

$y =$  ..... [3]

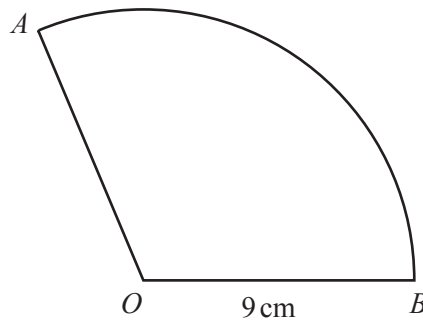




10

- 22  $AB$  is an arc of a circle, center  $O$ , radius 9 cm.  
 The length of the arc  $AB$  is  $6\pi$  cm.  
 The area of the sector  $AOB$  is  $k\pi$  cm<sup>2</sup>.

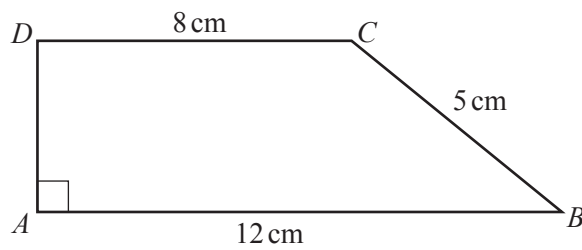
Find the value of  $k$ .



NOT TO SCALE

$k = \dots\dots\dots$  [3]

23



NOT TO SCALE

Work out the area of this trapezoid.

$\dots\dots\dots$  cm<sup>2</sup> [4]

24 Factor completely.

(a)  $2a + 4 + ap + 2p$

..... [2]

(b)  $162 - 8t^2$

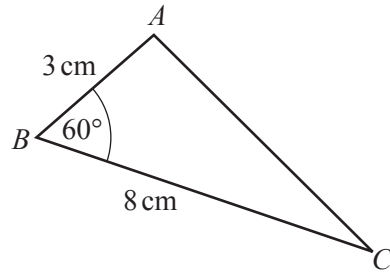
..... [2]

25  $A$  is the point (4, 1) and  $B$  is the point (10, 15).

Find the equation of the perpendicular bisector of the line  $AB$ .

..... [6]

**Question 26 is printed on the next page.**

NOT TO  
SCALE

- (a) Work out the exact area of triangle  $ABC$ .

.....  $\text{cm}^2$  [3]

- (b) Work out the length of  $AC$ .

$AC =$  .....  $\text{cm}$  [3]

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