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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/03**

Paper 3 (Core)

**For examination from 2020**

SPECIMEN PAPER

**1 hour 45 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, centre 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.
- You should use a graphic display calculator where appropriate.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use your calculator value.

## INFORMATION

- The total mark for this paper is 96.
- The number of marks for each question or part question is shown in brackets [ ].

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

**Formula List**

Area,  $A$ , of triangle, base  $b$ , height  $h$ .  $A = \frac{1}{2}bh$

Area,  $A$ , of circle, radius  $r$ .  $A = \pi r^2$

Circumference,  $C$ , of circle, radius  $r$ .  $C = 2\pi r$

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

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

Curved surface area,  $A$ , of sphere of radius  $r$ .  $A = 4\pi r^2$

Volume,  $V$ , of prism, cross-sectional area  $A$ , length  $l$ .  $V = Al$

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

Volume,  $V$ , of cylinder of radius  $r$ , height  $h$ .  $V = \pi r^2 h$

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

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

Answer **all** the questions.

1 (a) Write 32 652

(i) correct to the nearest 10,

..... [1]

(ii) correct to the nearest 100.

..... [1]

(b) Write 62.584 correct to 1 decimal place.

..... [1]

(c) Calculate  $4.8^4$ .

..... [1]

(d) Find  $\sqrt[3]{216}$ .

..... [1]

(e) Find the highest common factor (HCF) of 18 and 45.

..... [1]

(f) Find the lowest common multiple (LCM) of 6 and 8.

..... [1]

(g) Divide 442 in the ratio 8 : 9.

..... : ..... [2]

(h) Sem buys 7 hamburgers each costing \$1.20 .

Find how much change he receives from \$10.

\$ ..... [2]

- 2 (a) Write 0.75 as a fraction.

..... [1]

- (b) Write  $\frac{2}{3}$  as a percentage, giving your answer correct to 4 significant figures.

.....% [2]

- (c) Write 48% as a fraction in its lowest terms.

..... [2]

- (d) The price of a jacket is \$96.  
The price is reduced by 20%.

Find the new price of the jacket.

\$ ..... [2]

- (e) \$800 is invested at a rate of 3% per year compound interest.

Find the value of the investment after 5 years.

\$ ..... [3]

- 3** A special die has 10 faces numbered 1 to 10.  
When the die is rolled it is equally likely to land on any face.

Find the probability that the die lands on

- (a)** an even number,

..... [1]

- (b)** a prime number,

..... [1]

- (c)** 11,

..... [1]

- (d)** a square number less than 5.

..... [1]

- 4 Jacinta asks some students in her class which colour they prefer. The results are in the table.

Colour	Number of students
Brown	1
Green	4
Black	8
Pink	12
Blue	15

- (a) Calculate the total number of students.

..... [1]

- (b) Write down the most popular colour.

..... [1]

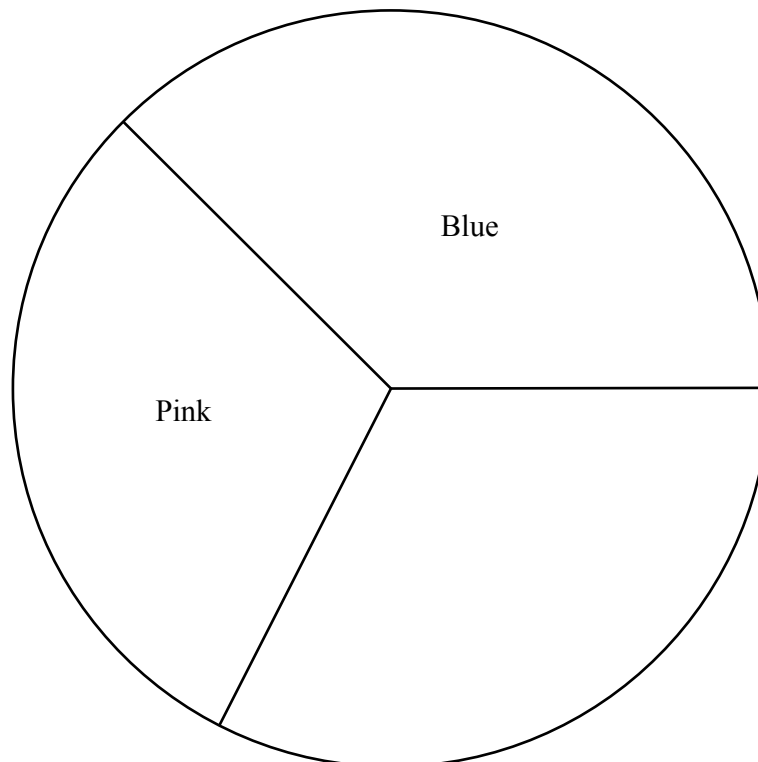
(c) Jacinta wants to draw a pie chart for these results.

Colour	Number of students	Sector angle in pie chart
Brown	1	
Green	4	
Black	8	
Pink	12	$108^\circ$
Blue	15	$135^\circ$

(i) Complete the table.

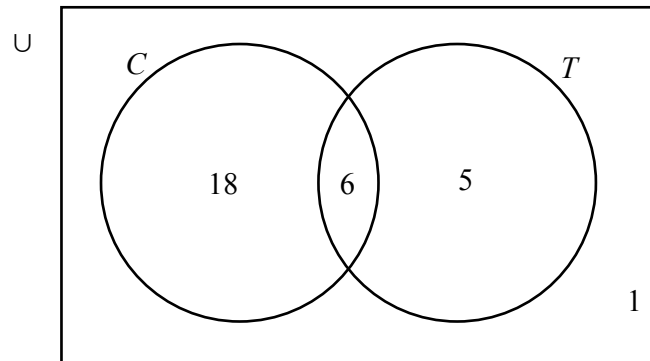
[2]

(ii) Complete the pie chart to show this information.  
Two sectors have been drawn for you.



[2]

- 5 HanRa asked 30 students if they ate cereal ( $C$ ) or toast ( $T$ ) for breakfast. The information is shown in the Venn diagram.



Write down the number of students in

- (a)  $C \cap T$ ,

..... [1]

- (b)  $C$ ,

..... [1]

- (c)  $(C \cup T)'$ ,

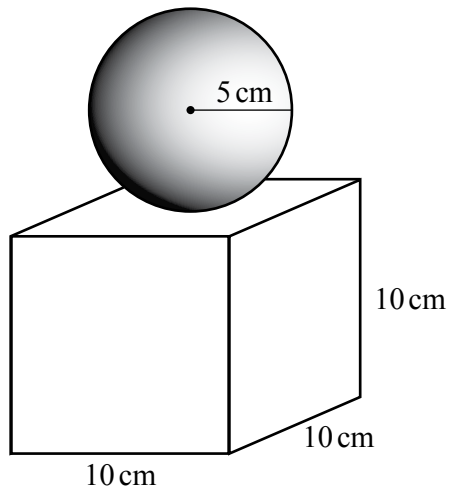
..... [1]

- (d)  $T \cup C'$ .

..... [1]



NOT TO SCALE



A trophy is in the shape of a cube of side 10 cm with a sphere of radius 5 cm on top.

(a) Find the surface area of the cube.

.....cm<sup>2</sup> [2]

(b) Find the surface area of the sphere.

.....cm<sup>2</sup> [2]

(c) Find the total **volume** of the trophy.

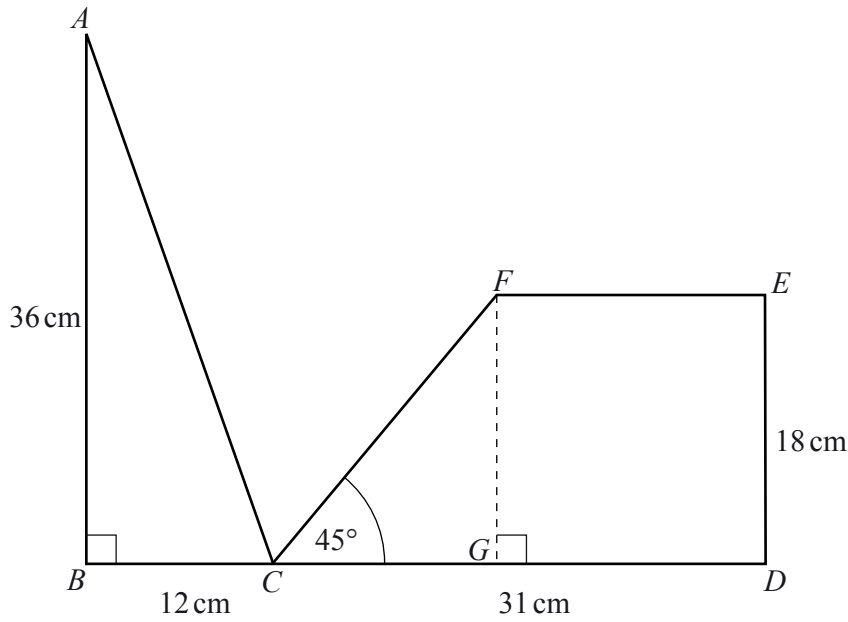
.....cm<sup>3</sup> [4]

The trophy is made from metal that costs 4 cents per cm<sup>3</sup>.

(d) Find the cost of the metal used to make the trophy.  
Give your answer in dollars.

\$ ..... [2]

7



NOT TO SCALE

The diagram shows the design for a company logo.  
 The logo is made up of a triangle  $ABC$  and a trapezium  $CDEF$ .  
 $BCGD$  is a straight line and angle  $FCD = 45^\circ$ .

$AB = 36$  cm,  $BC = 12$  cm,  $CD = 31$  cm and  $ED = 18$  cm.

(a) Find the size of angle  $CFE$ .

Angle  $CFE = \dots\dots\dots$  [1]

(b) Use trigonometry to calculate the size of angle  $BCA$ .

Angle  $BCA = \dots\dots\dots$  [2]

(c) Use Pythagoras' Theorem to find the length of  $AC$ .

$AC = \dots\dots\dots$  cm [2]

(d) Calculate the length of  $CF$ .

$CF = \dots\dots\dots$  cm [3]

(e) (i) Explain why  $EF = 13$  cm.

[2]

(ii) Find the total perimeter of the logo.

$\dots\dots\dots$  cm [1]

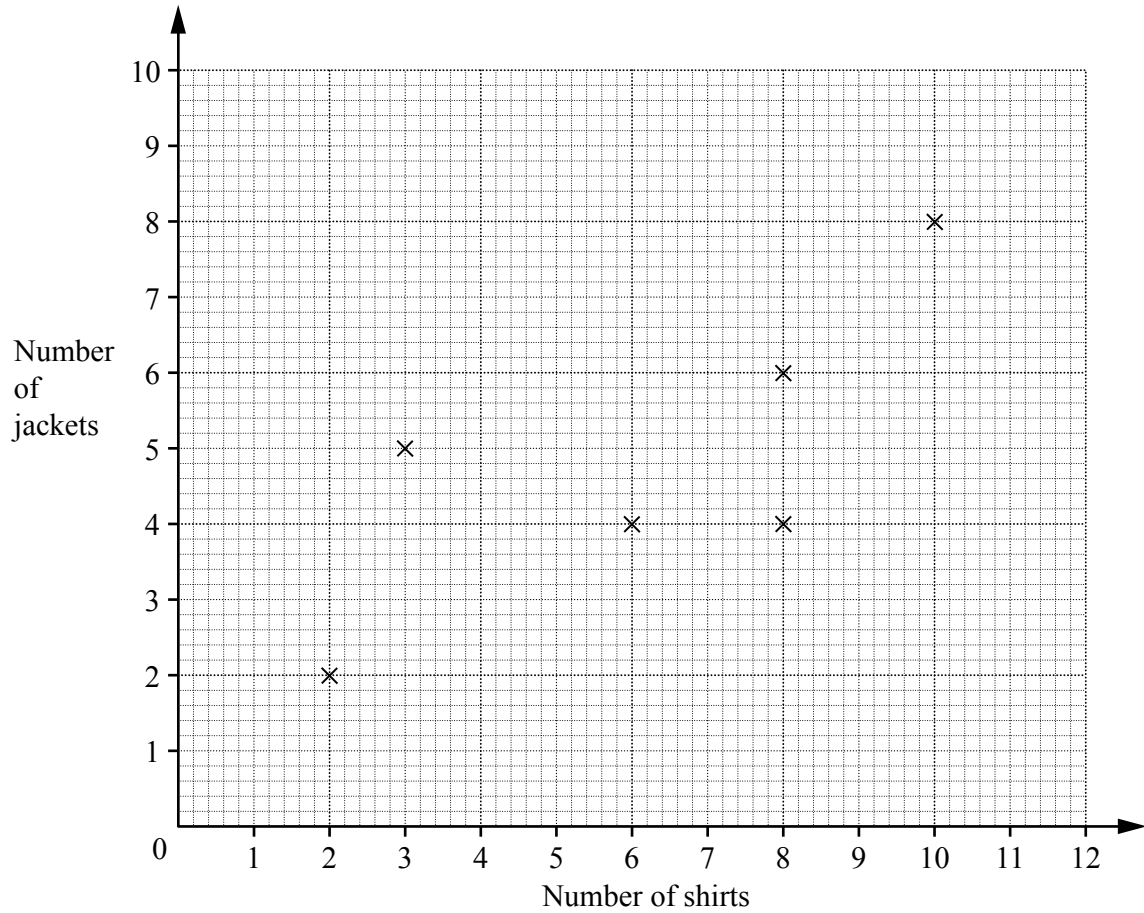
(f) Calculate the total area of the logo.

$\dots\dots\dots$  cm<sup>2</sup> [3]

8 The table shows the number of shirts and the number of jackets owned by 12 students.

Shirts	3	6	2	8	8	10	6	5	9	8	4	12
Jackets	5	4	2	4	6	8	5	4	6	5	4	7

- (a) Complete the scatter diagram.  
The first 6 points have been plotted for you.



[2]

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

..... [1]

(c) (i) Find the mean number of shirts.

..... [1]

(ii) Find the mean number of jackets.

..... [1]

(iii) On the diagram, plot the mean point.

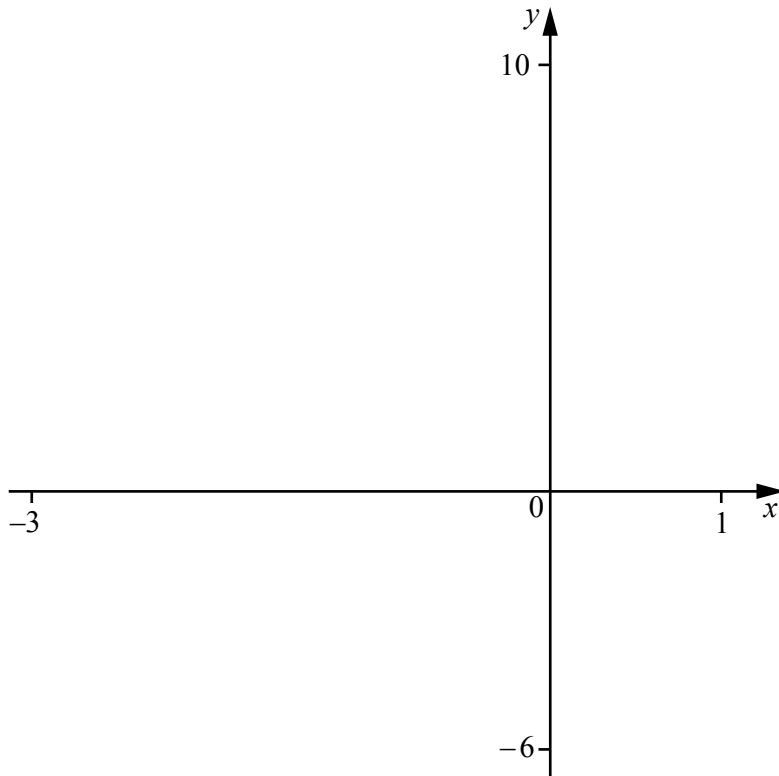
[1]

(d) On the diagram, draw a line of best fit by eye.

[2]

(e) Use your line of best fit to estimate the number of jackets for a student who has 7 shirts.

..... [1]



$$f(x) = 6 - 5x - 3x^2$$

(a) On the diagram, sketch the graph of  $y = f(x)$  for  $-3 \leq x \leq 1$ . [2]

(b) Write down the  $y$ -coordinate of the point where the graph crosses the  $y$ -axis.

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

(c) Write down the  $x$ -coordinates of the points where the graph crosses the  $x$ -axis.

$x = \dots\dots\dots$  and  $x = \dots\dots\dots$  [2]

(d) Find the coordinates of the local maximum point.

( $\dots\dots\dots$ ,  $\dots\dots\dots$ ) [1]

(e)  $g(x) = 2x + 4$

On the same diagram, sketch the graph of  $y = g(x)$ . [2]

(f) Find the coordinates of the points of intersection of  $f(x)$  and  $g(x)$ .

( $\dots\dots\dots$ ,  $\dots\dots\dots$ ) and ( $\dots\dots\dots$ ,  $\dots\dots\dots$ ) [2]

10 (a) Solve.

(i)  $5x + 6 = -4$

..... [2]

(ii)  $6x + 3 < 21$

..... [2]

(b) Simplify.

(i)  $s^3 \times s^4$

..... [1]

(ii)  $(t^2)^4$

..... [1]

(iii)  $18r^3 \div 3r$

..... [2]

(c) Expand and simplify.

$$4(x - 3) + 3(2x + 1)$$

..... [2]

(d) Factorise completely.

$$15y - 3y^2$$

..... [2]

**Question 11 is printed on the next page.**

- 11 (a) Ahmed cycles 15 kilometres in 50 minutes.

Find his average speed in kilometres per hour.

..... km/h [3]

- (b) George runs 15 kilometres at an average speed of 12 kilometres per hour.

Find how many minutes it takes George to run the 15 kilometres.

..... min [3]

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