Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  - **there may be more space than you need.**
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain **NO** credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  - **use this as a guide as to how much time to spend on each question.**

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.
Pythagoras’ Theorem
\[ a^2 + b^2 = c^2 \]

Area of a trapezium = \( \frac{1}{2}(a + b)h \)

Volume of prism = area of cross section \( \times \) length

Circumference of circle = \( 2\pi r \)

Area of circle = \( \pi r^2 \)

Volume of cylinder = \( \pi r^2h \)

Curved surface area of cylinder = \( 2\pi rh \)
Answer ALL TWENTY questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. (a) (i) What fraction of this shape is shaded?

(ii) Write your fraction as a decimal.

(b) Find a fraction that is equivalent to \( \frac{2}{7} \)

(c) Write 65% as a decimal.

72% of a shape is coloured red.
The rest of the shape is coloured blue.

(d) What percentage of the shape is coloured blue?

(Total for Question 1 is 5 marks)
2 Jan recorded the number of steps she took each day last week. This information is shown in the table.

<table>
<thead>
<tr>
<th>Day</th>
<th>Number of steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>9780</td>
</tr>
<tr>
<td>Tuesday</td>
<td>4853</td>
</tr>
<tr>
<td>Wednesday</td>
<td>12038</td>
</tr>
<tr>
<td>Thursday</td>
<td>15243</td>
</tr>
<tr>
<td>Friday</td>
<td>4695</td>
</tr>
<tr>
<td>Saturday</td>
<td>4801</td>
</tr>
<tr>
<td>Sunday</td>
<td>11856</td>
</tr>
</tbody>
</table>

(a) On which day did she take the least number of steps?

(b) Write the number 12038 in words.

(c) Round the number 4853 correct to the nearest hundred.

Two of the numbers in the table are multiples of 5

(d) Write down these two numbers.

Jan takes 1200 steps to walk one kilometre.

(e) Use this information to work out how many kilometres Jan walked on Thursday. Give your answer correct to the nearest kilometre.
(f) Work out the mean number of steps per day Jan took last week.

3

$L$ and $M$ are points on a circle, centre $O$.

(a) Write down the mathematical name for the straight line $OM$.

(b) Write down the mathematical name for the straight line $LM$.

(c) On the diagram, shade a segment.
The bar chart shows information about the population of each of five countries in 2013.

(a) Write down the population of Sri Lanka.

.......................................... million

(1)

(b) Write down the population of the UAE.

.......................................... million

(1)

(c) Which country had a population of 41 million?

.......................................................

(1)

Suki says,

“In 2013, the population of Singapore was \( \frac{1}{5} \) of the population of Sri Lanka.”

(d) Is Suki correct?

You must give a reason for your answer.

..................................................................................................................................................................................................................................................

..................................................................................................................................................................................................................................................

(1)

In 2013, the population of Saudi Arabia was 29 million.

(e) Draw a bar on the bar chart to show this information.

(1)
In 2013, the ratio of the population of India to the population of the UK, in millions, was 1252:64

(f) Write the ratio 1252:64 in its simplest form.

5 (a) Write down a prime number between 20 and 40

(b) Work out the cube of 7
6. (a) Change 8 metres into centimetres.

.......................................... centimetres

(1)

(b) Change 9500 cm³ into litres.

.......................................... litres

(1)

(c) Complete the sentence by writing a suitable metric unit on the dotted line.

The weight of a car is 2500 .......................................................

(1)

(d) Write 23:45 as a time using the 12-hour clock.

.......................................................

(1)

Jim goes to sleep at 9:30 pm.
He wakes up the next morning at 7:15 am.

(e) For how long did Jim sleep?

.......................................................

(2)

The area of the floor of a room is 12 m²

(f) Change 12 m² into cm²

.......................................... cm²

(2)

(Total for Question 6 is 8 marks)
7 Here are 8 cards. Each card has a letter on it.

[Diagram of cards: A A A B C C C C]

Malik takes at random one of these cards.

<table>
<thead>
<tr>
<th>impossible</th>
<th>unlikely</th>
<th>evens</th>
<th>likely</th>
<th>certain</th>
</tr>
</thead>
</table>

(a) Write down the word from the box that best describes the likelihood that Malik takes

(i) a card with the letter B.

(ii) a card with the letter D.

(b) Find the probability that Malik takes a card with the letter A.

Sunil has two sets of cards, Set 1 and Set 2
Each card has a letter on it.

[Diagram of sets: E F G W X]

Set 1
Set 2

Sunil takes one card from Set 1
He then takes one card from Set 2

(c) List all the possible combinations of cards he could get.

..................................................................................................................................................................................................................................................
..................................................................................................................................................................................................................................................
..................................................................................................................................................................................................................................................

(2)

(Total for Question 7 is 6 marks)
8. (a) Simplify $p + p + p + p - p$

(b) Simplify $6 \times e \times 5 \times f$

(c) Solve $8m = 40$

(d) Solve $20 - k = 16$

$\text{\textbf{\textit{a}} = 3c + f}$

(e) Work out the value of $c$ when $a = 23$ and $f = 5$

$\text{\textbf{\textit{c}} = \ldots}$

(Total for Question 8 is 7 marks)
9. You can use this graph to change between pounds (£) and Hong Kong dollars (HKD).

(a) Change 120 Hong Kong dollars into pounds.

£.......................................................

(1)

(b) Change £6 into Hong Kong dollars.

....................................................... HKD

(1)

(c) Change 1000 Hong Kong dollars into pounds.

£.......................................................

(2)

(Total for Question 9 is 4 marks)
10 (a) Work out \( \frac{2}{9} \) of 738 kg.

........................................... kg

...........................................

(b) What fraction of the horses in the field are not brown?

(c) Show that \( \frac{10}{21} - \frac{1}{3} = \frac{1}{7} \)

(Total for Question 10 is 6 marks)
ABC is a straight line.
ABDE is a quadrilateral.

(a) (i) Work out the value of \( x \).

\[ x = \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \]

(ii) Give a reason for your answer.

(b) Work out the value of \( y \).

\[ y = \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \]

Each exterior angle of a regular polygon is 18°

(c) Work out the number of sides of this regular polygon.

\[ \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \]

(Total for Question 11 is 7 marks)
12  $A$ is the point with coordinates (4, 11)
$B$ is the point with coordinates (8, 3)

Work out the coordinates of the midpoint of $AB$.

(............................ , ............................ )

(Total for Question 12 is 2 marks)

13  A plane flew 8740 km from Nairobi to Hong Kong.
The flight time was 13 hours 15 minutes.

Work out the average speed of the plane.
Give your answer, in kilometres per hour, correct to the nearest whole number.

.......................................................  kilometres per hour

(Total for Question 13 is 3 marks)
There are 80 counters in a bag. 
The counters are either red or blue.

The ratio of the number of red counters to the number of blue counters is 3 : 1

Michael takes 15% of the red counters out of the bag.
Alison takes $\frac{1}{5}$ of the blue counters out of the bag.

How many counters are now in the bag?
(a) Describe fully the single transformation that maps shape A onto shape B.

(b) On the grid, rotate shape A $90^\circ$ anticlockwise about (0, 0)
   Label the new shape C.

(Total for Question 15 is 4 marks)
16 On the grid, draw the graph of $y + 2x = 6$ for values of $x$ from $-2$ to $4$

(Total for Question 16 is 4 marks)
17 A lion is 224 cm long.

Simon makes a scale model of the lion.
He uses a scale of 1 : 8

(a) Work out the length of the scale model.

....................................................... cm 

(2)

In 2010, there were 411 Asiatic lions in India.
In 2015, there were 523 Asiatic lions in India.

(b) Work out the percentage increase in the number of Asiatic lions in India from 2010 to 2015.
Give your answer correct to 1 decimal place.

....................................................... %

(3)

(Total for Question 17 is 5 marks)
18 The table gives information about the weights of 20 rugby players.

<table>
<thead>
<tr>
<th>Weight ($w$ kg)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$80 &lt; w \leq 90$</td>
<td>3</td>
</tr>
<tr>
<td>$90 &lt; w \leq 100$</td>
<td>5</td>
</tr>
<tr>
<td>$100 &lt; w \leq 110$</td>
<td>7</td>
</tr>
<tr>
<td>$110 &lt; w \leq 120$</td>
<td>4</td>
</tr>
<tr>
<td>$120 &lt; w \leq 130$</td>
<td>1</td>
</tr>
</tbody>
</table>

(a) Write down the modal class.

.......................................................

(1)

(b) Work out an estimate for the total weight of these 20 rugby players.

.......................................................  kg

(3)

(Total for Question 18 is 4 marks)
19 Here is an isosceles triangle.

Diagram NOT accurately drawn

18 cm 18 cm

14 cm

Work out the area of the triangle.
Give your answer correct to 3 significant figures.

....................................................... cm²

(Total for Question 19 is 4 marks)
20 (a) Solve \[7x + 2y = 16\]
\[5x - 2y = 20\]
Show clear algebraic working.

\[x = \ldots\]
\[y = \ldots\]  
(3)

(b) Expand and simplify \((k + 9)(k - 5)\)

\[(k + 9)(k - 5) = k^2 + 4k - 45\]  
(2)

(Total for Question 20 is 5 marks)