

**19** Write 1200 as a product of powers of its prime factors.  
Show your working clearly.

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.....  
**(Total for Question 19 is 3 marks)**



20 Alberto, Bill, Candela and Diana are four friends.

Here is some information about the height of each of these friends.

Alberto's height is 158 cm.

Bill's height is 175 cm.

Candela's height is greater than Diana's height.

The median height of these four friends is 160 cm.

The range of the heights of these four friends is 21 cm.

Work out Candela's height and Diana's height.

Candela ..... cm

Diana ..... cm

**(Total for Question 20 is 3 marks)**



21  $\mathcal{E} = \{9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{multiples of } 3\}$

$B = \{\text{odd numbers}\}$

(a) List the members of the set

(i)  $A \cap B$

.....  
(1)

(ii)  $A \cup B$

.....  
(1)

(b) Is it true that  $24 \in A$ ?

Tick one of the boxes below.

Yes

No

Give a reason for your answer.

.....  
.....  
(1)

Set  $C$  has 4 members such that  $C \cap B' = \{10, 18\}$

(c) List the members of one possible set  $C$

.....  
(2)

(Total for Question 21 is 5 marks)



22 The diagram shows a shape made from a square  $ABCD$  and 4 identical semicircles.

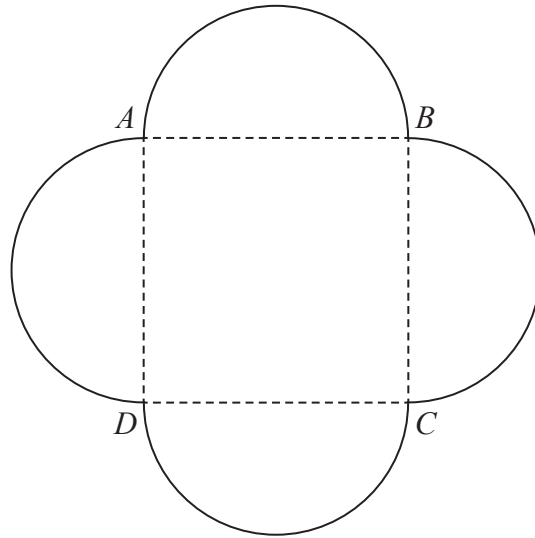


Diagram **NOT**  
accurately drawn

As shown in the diagram, the semicircles have  $AB$ ,  $BC$ ,  $CD$  and  $DA$  as diameters.

The area of the square is  $36 \text{ cm}^2$

Calculate the total area of the shape.

Give your answer correct to one decimal place.

.....  $\text{cm}^2$

(Total for Question 22 is 4 marks)



23 (a) Solve  $p = \frac{3p - 5}{10}$

Show clear algebraic working.

$p = \dots\dots\dots$   
(3)

(b) Simplify  $a^0$  where  $a > 0$

$\dots\dots\dots$   
(1)

(c) Simplify fully  $\frac{3xy^3}{6x^2y}$

$\dots\dots\dots$   
(2)

(d) Factorise fully  $10c^3d^2 + 15cd^4$

$\dots\dots\dots$   
(2)

(Total for Question 23 is 8 marks)

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24  $\frac{2^k}{4^n} = 2^x$

Find an expression for  $x$  in terms of  $k$  and  $n$

$x = \dots\dots\dots$

(Total for Question 24 is 2 marks)

25 A cinema increased the cost of an adult ticket by 12%  
After the increase, the cost of an adult ticket was £18.20  
Work out the cost of an adult ticket before the increase.

£.....

(Total for Question 25 is 3 marks)



- 26 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	$7.7 \times 10^6$
Barcelona	$5.5 \times 10^6$
Chicago	$8.8 \times 10^6$
Lagos	$1.3 \times 10^7$
Tokyo	$3.7 \times 10^7$

- (a) Write  $8.8 \times 10^6$  as an ordinary number.

.....  
(1)

- (b) Which of these cities had the least population in 2018?

.....  
(1)

- (c) Work out the difference between the population of Tokyo and the population of Ahmedabad in 2018  
Give your answer in standard form correct to 2 significant figures.

.....  
(2)

(Total for Question 26 is 4 marks)



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27 The diagram shows triangle  $ABP$  inside the regular hexagon  $ABCDEF$

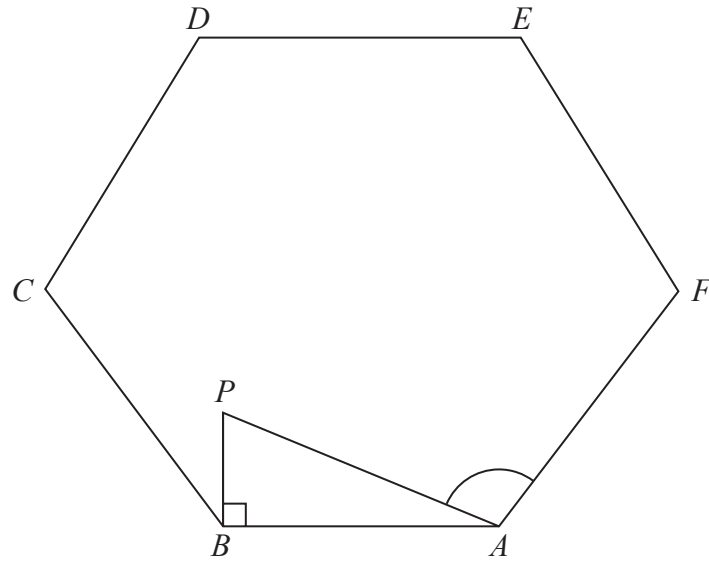


Diagram NOT accurately drawn

$$AB = 5 \text{ cm}$$

$$BP = 2 \text{ cm}$$

$$\text{Angle } ABP = 90^\circ$$

Work out the size of angle  $PAF$

Give your answer correct to 3 significant figures.

(Total for Question 27 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

