

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

20  $P = \frac{t - w}{y}$

$t = 9.7$  correct to 1 decimal place

$w = 5.9$  correct to 1 decimal place

$y = 3$  correct to 1 significant figure

Calculate the upper bound for the value of  $P$ .  
Show your working clearly.

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



21 Given that  $x = \frac{5}{9y+5}$  and that  $y = \frac{5}{5a-2}$

find an expression for  $x$  in terms of  $a$ .

Give your expression as a single fraction in its simplest form.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

.....  
(Total for Question 21 is 4 marks)



DO NOT WRITE IN THIS AREA

22 The diagram shows a triangular prism  $ABCDEF$  with a horizontal base  $ABEF$ .

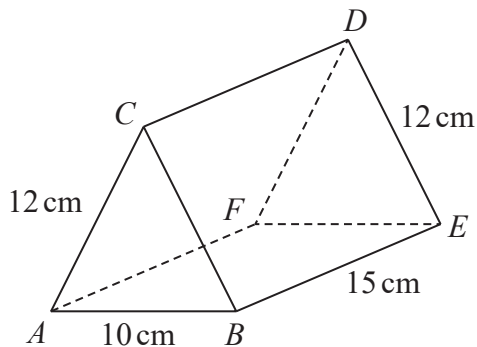


Diagram **NOT** accurately drawn

$$AC = BC = FD = ED = 12 \text{ cm} \quad AB = 10 \text{ cm} \quad BE = 15 \text{ cm}$$

Calculate the size of the angle between  $AD$  and the base  $ABEF$ .  
Give your answer correct to 3 significant figures.

.....  
(Total for Question 22 is 4 marks)



P 6 5 9 1 4 A 0 2 1 2 8

- 23 The sum of the first  $N$  terms of an arithmetic series,  $S$ , is 292  
The 2nd term of  $S$  is 8.5  
The 5th term of  $S$  is 13

Find the value of  $N$ .

Show clear algebraic working.

$N = \dots\dots\dots$

(Total for Question 23 is 5 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

24 The functions  $f$  and  $g$  are defined as

$$f(x) = 5x^2 - 10x + 7 \quad \text{where } x \geq 1$$

$$g(x) = 7x - 6$$

(a) Find  $fg(2)$

.....  
(2)

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) = \dots$

$f^{-1}(x) = \dots$   
(4)

(Total for Question 24 is 6 marks)



- 25 The diagram shows two circles such that the region **R**, shown shaded in the diagram, is the region common to both circles.

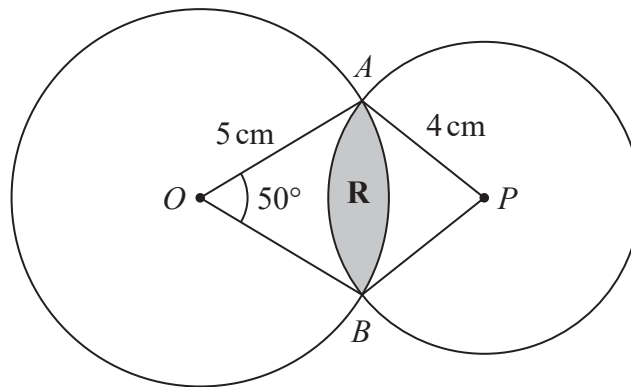


Diagram **NOT** accurately drawn

One of the circles has centre  $O$  and radius  $5\text{ cm}$ .  
 The other circle has centre  $P$  and radius  $4\text{ cm}$ .  
 Angle  $AOB = 50^\circ$

Calculate the area of region **R**.  
 Give your answer correct to 3 significant figures.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

..... cm<sup>2</sup>

**(Total for Question 25 is 6 marks)**

**Turn over for Question 26**



P 6 5 9 1 4 A 0 2 5 2 8

26  $OACB$  is a trapezium.

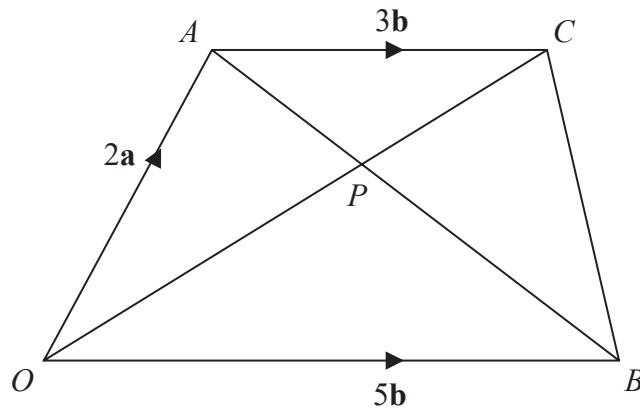


Diagram **NOT**  
accurately drawn

$$\vec{OA} = 2\mathbf{a} \quad \vec{OB} = 5\mathbf{b} \quad \vec{AC} = 3\mathbf{b}$$

The diagonals,  $OC$  and  $AB$ , of the trapezium intersect at the point  $P$ .

Find and simplify an expression, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , for  $\vec{OP}$   
Show your working clearly.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA





DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

$$\vec{OP} = \dots\dots\dots$$

(Total for Question 26 is 5 marks)

---

**TOTAL FOR PAPER IS 100 MARKS**

