

17

$$y = x^3 - 2x^2 - 15x + 5$$

(a) Find  $\frac{dy}{dx}$

$$\frac{dy}{dx} = \dots\dots\dots (2)$$

C is the curve with equation  $y = x^3 - 2x^2 - 15x + 5$

(b) Work out the range of values of  $x$  for which C has a negative gradient.

$$\dots\dots\dots (4)$$

(Total for Question 17 is 6 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



18 A triangle has sides of length 8 cm, 10 cm and 14 cm.

Work out the size of the largest angle of the triangle.  
Give your answer correct to 1 decimal place.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

.....  
(Total for Question 18 is 3 marks)



19 The diagram shows a triangular prism.

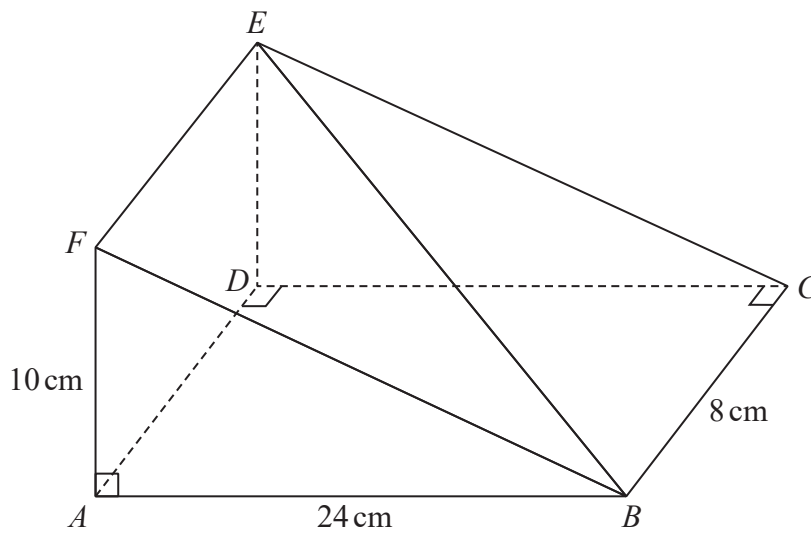


Diagram **NOT** accurately drawn

$AF = 10\text{ cm}$ ,  $AB = 24\text{ cm}$  and  $BC = 8\text{ cm}$ .  
 Angle  $FAB = \text{angle } ADC = \text{angle } BCD = 90^\circ$

Work out the size of the angle between the line  $BE$  and the plane  $ABCD$ .  
 Give your answer correct to 1 decimal place.

DO NOT WRITE IN THIS AREA

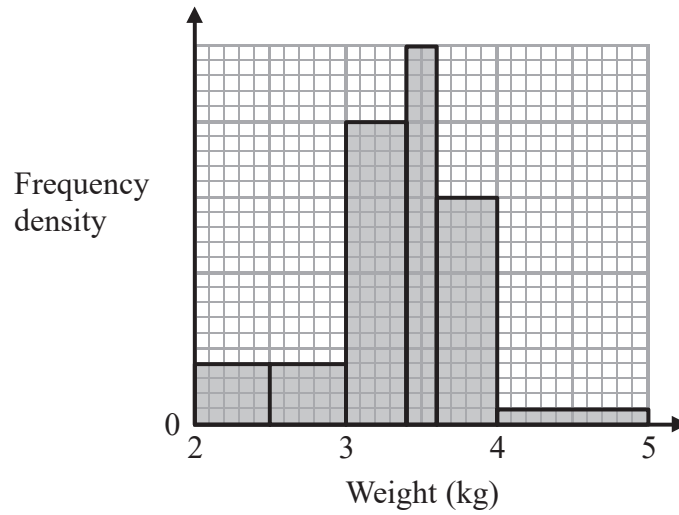
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 19 is 3 marks)



20 The histogram shows information about the birth weights of some babies.



6 of these babies had a birth weight less than 2.5 kg or greater than 4 kg.

Work out the number of babies who had a birth weight between 2.5 kg and 4 kg.

(Total for Question 20 is 3 marks)



- 21 (a) Show that  $\sqrt{45} + \sqrt{20} = 5\sqrt{5}$   
Show your working clearly.

(2)

- (b) Express  $\frac{2}{\sqrt{3}-1}$  in the form  $p + \sqrt{q}$   
where  $p$  and  $q$  are integers.  
Show your working clearly.

(2)

- (c) Express  $x^2 + 6\sqrt{2}x - 1$  in the form  $(x + a)^2 + b$   
Show your working clearly.

(2)

(Total for Question 21 is 6 marks)

DO NOT WRITE IN THIS AREA

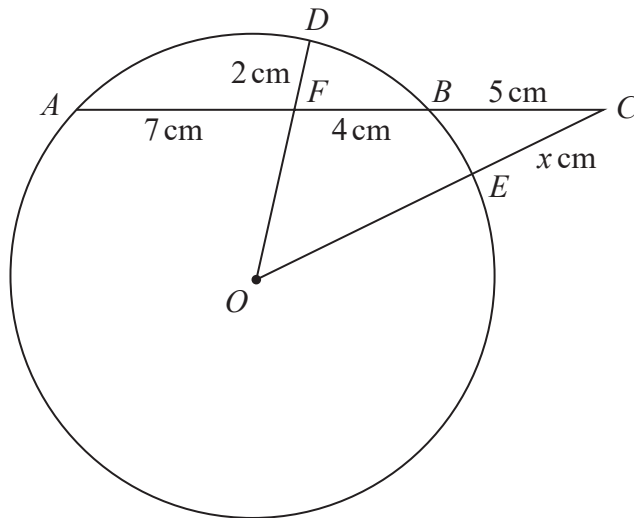
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



22

Diagram **NOT** accurately drawn



$A, D, B$  and  $E$  are points on a circle, centre  $O$ .  
 $AFBC, OEC$  and  $OFD$  are straight lines.

$AF = 7 \text{ cm}, FB = 4 \text{ cm}, BC = 5 \text{ cm}, FD = 2 \text{ cm}$  and  $CE = x \text{ cm}$ .

Work out the value of  $x$ .  
 Show your working clearly.

$x = \dots\dots\dots$

(Total for Question 22 is 6 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



23 The sum of the first 48 terms of an arithmetic series is 4 times the sum of the first 36 terms of the same series.

Find the sum of the first 30 terms of this series.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 23 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

