

20 The area of a rectangle is 18 cm^2

The length of the rectangle is $(\sqrt{7} + 1) \text{ cm}$.

Without using a calculator and showing each stage of your working,

find the width of the rectangle.

Give your answer in the form $a\sqrt{b} + c$ where a , b and c are integers.

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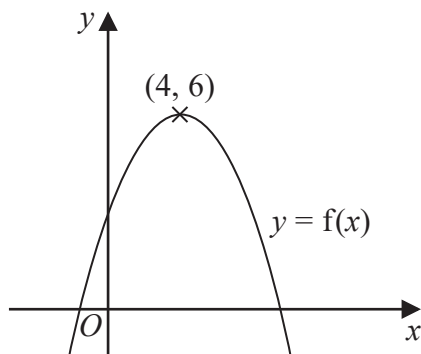
..... cm

(Total for Question 20 is 3 marks)



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21 The diagram shows a sketch of part of the curve with equation $y = f(x)$



There is one maximum point on this curve.
The coordinates of this maximum point are (4, 6)

(a) Write down the coordinates of the maximum point on the curve with equation

(i) $y = f(x + 4)$

(.....,) (2)

(ii) $y = f(2x)$

(.....,) (2)

The equation of a curve **C** is $y = x^2 + 3x + 4$

The curve **C** is transformed to curve **S** under the translation $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$

(b) Find an equation of curve **S**.

You do not need to simplify the equation.

..... (2)

(Total for Question 21 is 4 marks)



22 The line with equation $y = x + 2$ intersects the curve with equation $x^2 + y^2 - 2y = 24$ at the points A and B .

Find the coordinates of A and B .
Show clear algebraic working.

(.....,)

(.....,)

(Total for Question 22 is 5 marks)



23

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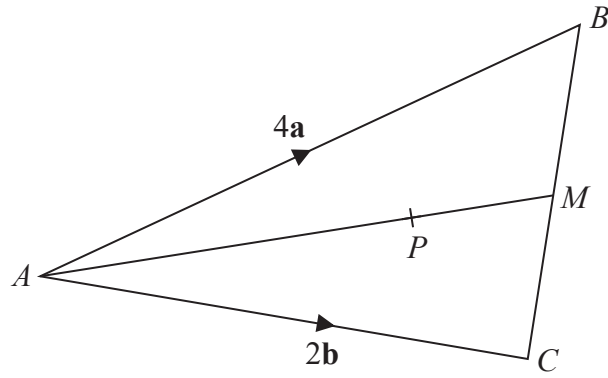


Diagram NOT accurately drawn

ABC is a triangle.
The midpoint of BC is M .
 P is a point on AM .

$$\vec{AB} = 4\mathbf{a}$$

$$\vec{AC} = 2\mathbf{b}$$

$$\vec{AP} = \frac{3}{2}\mathbf{a} + \frac{3}{4}\mathbf{b}$$

Find the ratio $AP:PM$

.....
(Total for Question 23 is 3 marks)



24 Express

$$\left(\frac{4}{2x-5} - \frac{3}{2x-3} \right) \div \frac{9x-4x^3}{6x^2-17x+5}$$

as a single fraction in its simplest form.

.....
(Total for Question 24 is 4 marks)



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25 Mario is going to save \$50 in the year 2021

He is going to continue to save, up to and including the year 2070, by increasing the amount he saves each year by \$ k

Mario will save a total of \$33 125 from 2021 to 2070

Work out the value of k .

$k = \dots\dots\dots$

(Total for Question 25 is 3 marks)



26 Here is a sector, AOB , of a circle with centre O and angle $AOB = x^\circ$

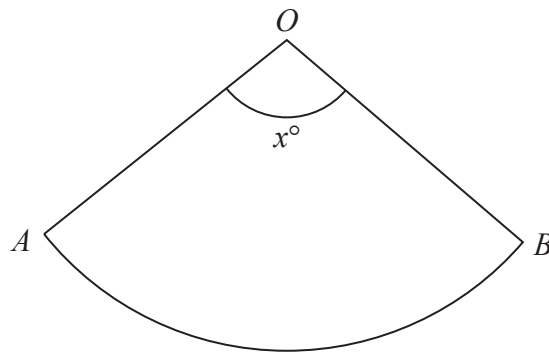


Diagram **NOT** accurately drawn

The sector can form the curved surface of a cone by joining OA to OB .

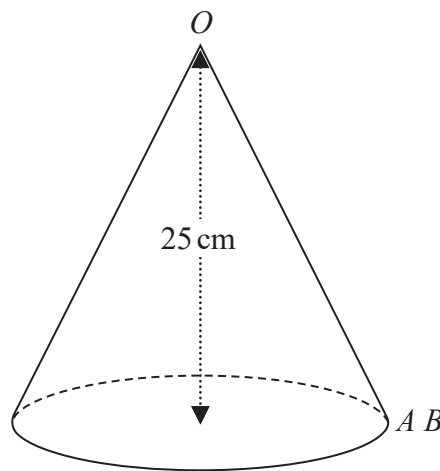


Diagram **NOT** accurately drawn

The height of the cone is 25 cm .
The volume of the cone is 1600 cm^3

Work out the value of x .
Give your answer correct to the nearest whole number.

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$x = \dots\dots\dots$

(Total for Question 26 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

