

- 19 The 25th term of an arithmetic series is 44.5
The sum of the first 30 terms of this arithmetic series is 765

Find the 16th term of the arithmetic series.
Show your working clearly.

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(Total for Question 19 is 5 marks)



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20 $a = 25 \times 10^{14n}$ where n is an integer.

Find an expression, in terms of n , for $a^{\frac{3}{2}}$
Give your answer in standard form.

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(Total for Question 20 is 3 marks)



21 A curve has equation $y = f(x)$

There is only one maximum point on the curve.
The coordinates of this maximum point are $(4, 3)$

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

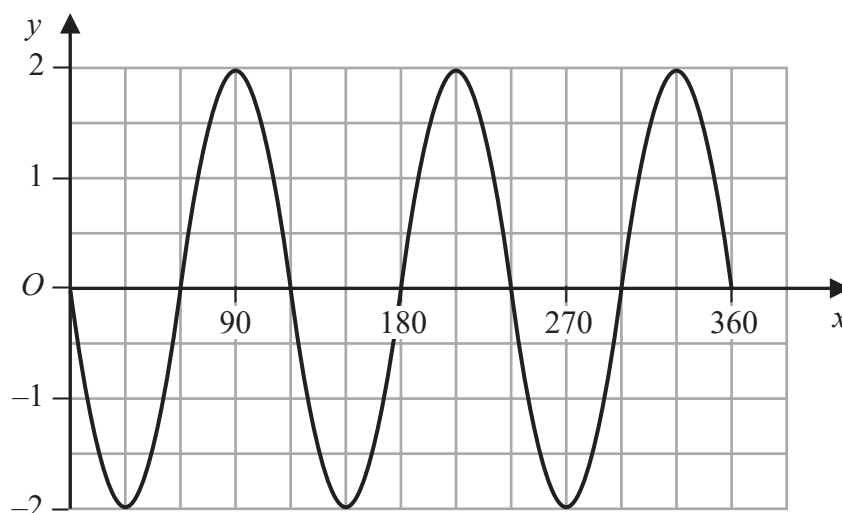
(i) $y = f(x - 5)$

(.....,) (1)

(ii) $y = 3f(x)$

(.....,) (2)

Here is the graph of $y = a \sin(bx)^\circ$ for $0 \leq x \leq 360$



(b) Find the value of a and the value of b .

$a =$

$b =$

(2)

(Total for Question 21 is 4 marks)



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22 Solve the simultaneous equations

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

$$y = 2x + 1$$

Show clear algebraic working.

(Total for Question 22 is 5 marks)



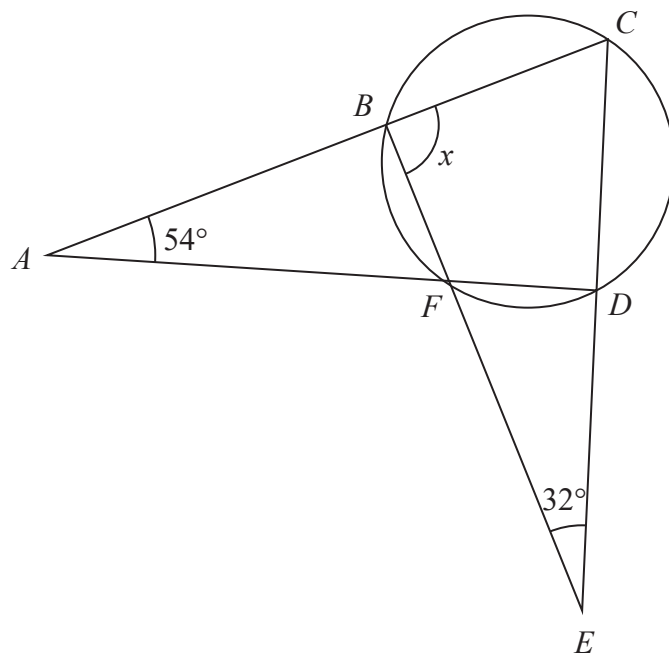


Diagram **NOT** accurately drawn

B, C, D and F are points on a circle.
 ABC, AFD, BFE and CDE are straight lines.

Work out the size of angle x .
 Show your working clearly.

$x = \dots\dots\dots^\circ$

(Total for Question 23 is 4 marks)

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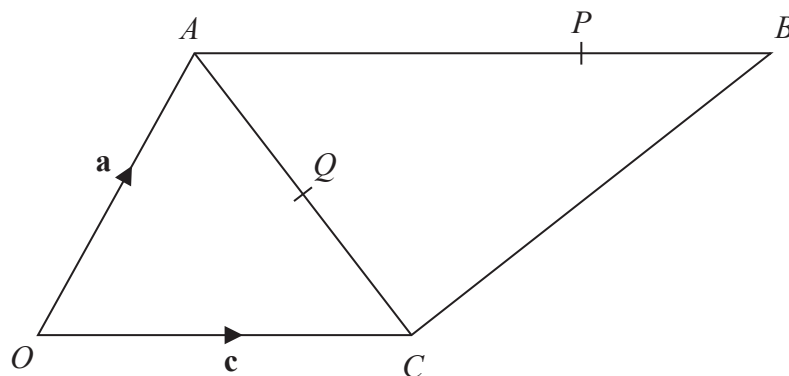


Diagram **NOT**
accurately drawn

$$\vec{OA} = \mathbf{a} \quad \vec{OC} = \mathbf{c} \quad \vec{AB} = 2\mathbf{c}$$

P is the point on AB such that $AP : PB = 3 : 1$

Q is the point on AC such that OQP is a straight line.

Use a vector method to find $AQ : QC$

Show your working clearly.

$$AQ : QC = \dots\dots\dots$$

(Total for Question 24 is 5 marks)



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25 A boat sails from point X to point Y and then to point Z .

Y is on a bearing of 280° from X .

Z is on a bearing of 220° from Y .

The distance from X to Y is 3.5 km.

The distance from Y to Z is 6 km.

Work out the bearing of Z from X .

Give your answer correct to 1 decimal place.

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(Total for Question 25 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

