

Diagram **NOT** accurately drawn

Figure 3

Figure 3 shows quadrilateral ABCD such that

$$\overrightarrow{AD} = 2\mathbf{a} + \mathbf{b}$$
 $\overrightarrow{BC} = \frac{1}{3}\mathbf{b}$ $\overrightarrow{BD} = -4\mathbf{a} - \mathbf{b}$

(a) Prove that \overrightarrow{AB} is parallel to \overrightarrow{DC}

(4)

The diagonals, AC and BD, of the quadrilateral intersect at the point Y.

(b) Using a vector method, find \overrightarrow{AY} as a simplified expression in terms of **a** and **b** (6)

	Question 9 continued
A	
S AREA	
IN TH	
NOT WRITE IN	
NOT	
DO	
EA	
HIS AREA	
WRITEIN	
) NOT	
Ď	
KE.A	
HIS AF	
EINT	
WRIT	
OO NOT WRITE IN THIS AREA	
۵	



>		>						X	
		١						V	
				0		<		$\langle \rangle$	
				>		>		X	
						١	7	V	
					7				
	⋖	>							
	2	Ċ	2				2		
						l			
							⟨		
					>		2	Ö	
	/					/	١	X	
				>				×	
				2				X	
								V	
							>		
							<		
							2		
			/				/		
					(
					2				
							1	$^{\sim}$	
						N		×	
		2	۲.					Х	
		1						V	
								X	
							/		
					>			♦	
					C				
			2				2	V	
						7		\triangle	
S									
							>		
			\		\		١	Λ	
	4	4	4	4	4				
	Я	г	7	₹					
			۷	2				X	
	7	7	7	2	7			V	
	N		P	ņ	'n.		>		
	a	ľ	3				≺	×	
	2	٩	ы	ы	r		2		
							/		
		2	\leq	2	۷				
	2	₹	7				2		
2	۲,	à	É	z			۱	a	
	Δ	۹	,	۰,	,	/		X	
		á	è		ù			$\langle \rangle$	
>	SI	Р	Ş					х	
	Λ	٠	×	ы	ø		7	\vee	
	7		3	7	'n		1		
	<ı	è	2	è					
							<	X	
		ζ	2				5	Ş	
?	Š	S	2				5	8	
>	S						8	8	
	S						5	8	
	3					5	3	8	
						3	3	× ×	
						2	3	\ \ \ \	
	S	2	j			}	3		
	8		3				3	× × ×	
	8		3				\ \ \		
	8		j						
	8		3				\ \ \	8	
	8		3						
	8		3					8	
								8	
								8	
			7						
>>>>>>>			7						
			7						
			7						

DO NOT WRITE IN THIS AREA

Question 9 continued	

Question 9 continued	
T)	otal for Question 9 is 10 marks)



- 10 Using suitable results for $\sin(A + B)$ and $\sin(A B)$ from the formulae page,
 - (a) show that $2\sin 4x\cos x = \sin 5x + \sin 3x$

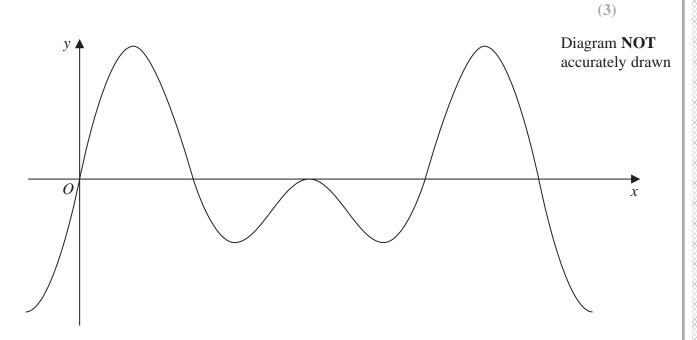


Figure 4

Figure 4 shows part of a sketch of the curve $y = 6 \sin 4x \cos x$

(b) Using calculus, find the total area bounded by the curve and the *x*-axis between x=0 and $x=\frac{\pi}{2}$

Give	vour	answer	to	3	significant	figures
OIVC	your	allswel	w	J	Significant	mgures.

•	,	C		(8)
				(0)

	Question 10 continued
IS AREA	
ITE IN TH	
NOT WRITE IN	
00	
AREA	
E IN THIS	
VOT WRITE IN	
DO	
REA	
OO NOT WRITE IN THIS AREA	
T WRITE	
DO NC	



DO NOT WRITE IN THIS AREA

Question 10 continued	

$\sim\sim\sim$
$\times\!\!\times\!\!\times$
XMAX.
×~~×
LO.

\otimes
$\times \times \times$
DO NOT WRITE IN THIS AREA
\times
\times
$\otimes \triangle$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\otimes \otimes \otimes$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
$\times\!\!\times\!\!\times$
XX X
X 22
X O EX
\times U n \times
$\times \times \times$
0
3
WR
LWR
OF WRIT
OT WRIT
NOT WRIT
NOT WRIT
O NOT WRIT
DO NOT WRIT
DO NOT WRIT
DO NOT WRITE IN THIS AREA
DO NOT WRD
DO NOT WRD
DO NOT WRIT
DO NOT WRIT
DO NOT WRD
DO NOT WRF
DO NOT WRIT
REA
AREA
THIS AREA
THIS AREA
THIS AREA
IN THIS AREA
EIN THIS AREA
EIN THIS AREA
EIN THIS AREA
EIN THIS AREA
EIN THIS AREA
WRITE IN THIS AREA
WRITE IN THIS AREA
WRITE IN THIS AREA
WRITE IN THIS AREA
WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA
NOT WRITE IN THIS AREA

Question 10 continued
(Total for Question 10 is 11 marks)



11 An equation of the straight line *l* is y - 3x = 3

The point A on l lies on the y-axis.

The point B on l has coordinates (10, b), where b is an integer.

The point C divides AB in the ratio 2:3

The straight line k passes through C and is perpendicular to l

(a) Show that an equation of k is

$$3y + x - 49 = 0$$

(6)

The point *D* with coordinates (p, q), where *q* is positive, is such that *AD* is parallel to *k* and the length of *AD* is $12\sqrt{10}$

(b) Find the coordinates of D

(6)

The point E lies on k such that DE is parallel to the y-axis. The point F lies on l such that DF is parallel to the y-axis.

(c) Find the exact area of triangle *ECF*.

(5)



	Question 11 continued
A	Question 11 continued
SAREA	
ETTS.	
ARITE	
NOT WRITE IN	
DO	
A	
THIS AREA	
WRITEIN	
NOT	
DQ	
EA	
IS AR	
IN TH	
WRITE	
OO NOT WRITE IN THIS AREA	
00	



						C
$\langle \times$	×	>	C	×		
$\langle \times$	\times	Š	Ĉ	X		Ö
\sim	×	S	Č	Ż		ð
X	×	Κ	Z	0		X
×	×	K	×			
X	×	K	×			×
×	X)	K	×	0		×
Ç×	×	2	ς	×		Ç
\propto	X	>	⟨			O
$\langle \times \rangle$		\geq				
\sim	×	S	Ö			<u>_</u>
×	×Ç	K	>	V	Κ	Х
	×	K	\rangle			
	X	K	×			
×		2		^	2	V
						♦
$\langle \times \rangle$		\geq		×		
		>				
X	×	Κ	2	Ç		X
X	×	×	×			×
8	X)		S			
SX	×	2	S	×		V
\propto	X	>	⟨			C
	×	7	C	X		
Ž.	×	×	2	×		Z.
X	\sim	K	×	ø		Х
	×ŵ	ś	ù	D		
	A	2	Ž	ħ		
\Diamond	×	7	5	×		Q
$\langle \times \rangle$	S	ø	ø	K		0
\propto	ΛW	2	4	k		
X	×Ç	7	7			X
	×	4	ì	ı,		
	X.	ú	и	D		
×	Ų.	۰	9	ĸ,	2	V
QX	V#	ø	۹	ĸ		Ç
	ж	2	G	K		
\propto	X	3	ζ	ik		Ŏ.
\simeq	Χjii	٠	Ė	ľ	S	X
X	×Ç	Κ	\geq	♡	Κ	Х
X	×	ú	è	₽		
	X.		≊	ñ		
	yΨ	F	5	Ď	2	V
$\langle \times$	×	-	6	ĸ	>	$^{\circ}$
$\langle \times \rangle$	X	а	C	K		
				K		
X	Š	5	7	D		
X	X	2	2	ľ	3	X
X		2	3		3	Š
8		2			3	8
		2			3	8
		2			3	
8					3	
					3	
8						
8						
8						
8						
8						
8						
8						
8						
8						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						
*						

DO NOT WRITE IN THIS AREA

Question 11 continued	

Question	11 continued			



\sim	\sim
	$\times \times$
	$\times \times \rangle$
$\sim\sim$	\sim
$\times \times \times$	$\sim \sim$
$\times \times$	$\times \times \rangle$
$\times \times \times$	$\times \times$
\sim	\sim
$\sim\sim$	\sim
	$\times \times$
$\times \times$	$\times \times \rangle$
\sim	\sim
$\sim \sim$	$\sim\sim$
$\times \times$	$\times \times \wedge$
$\times \times \times$	$\times \times$
.хх.	$\times \times \rangle$
$\sim\sim$	\sim
$\times \times \times$	$\sim \sim$
$\times \times$	
$\times \times \times$	
\sim	\sim
$\sim \sim$	\sim
	$\times \times$
$\times \times$	$\times \times \rangle$
√B/N	
××	$\times \times$
O	\bowtie
^BC√3	
× 7	$\sim \sim$
$\times \times$	$\times \times$
$\times \times \times$	•××
~~	\sim
X 744.2	"XX
100	$\times \times$
	$r \sim r \sim 10^{-1}$
	∞
	∎××
$\mathcal{N}\mathcal{N}$	
$\sim\sim$	\sim
	ev.
1	
	$\times \times$
4	iXX
	5/\/\
, Indian	
Xali.	∞
× ,	\bowtie
	\bowtie
×	
	∞
×	
×	∞
×	∞
	∞
	∞
×	∞
7	∞
THIN THIS	
THIN THIS A	
THIN THIS A	
THE NUMBER OF	
THIN THIS A	
THIN THIS AR	
THE NUMBER OF	
THUNDAY ARE	
THIN THIS AR	
THIN THIS AREA	
THIN THIS AREA	
TEIN THIS AREA	
THIN THIS AREA	

DO NOT WRITE IN THIS AREA

uestion 11 continued	
	(Total for Question 11 is 17 marks)
	TOTAL FOR PAPER IS 100 MARKS

P 7 1 6 4 1 A 0 3 6 3 6