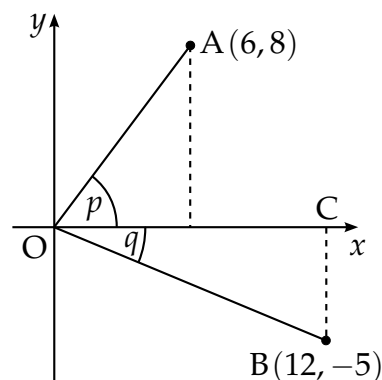


Higher 2000 - Paper 1 Solutions

- [SQA] 1. On the coordinate diagram shown, A is the point $(6, 8)$ and B is the point $(12, -5)$. Angle $AOC = p$ and angle $COB = q$.

Find the exact value of $\sin(p + q)$.

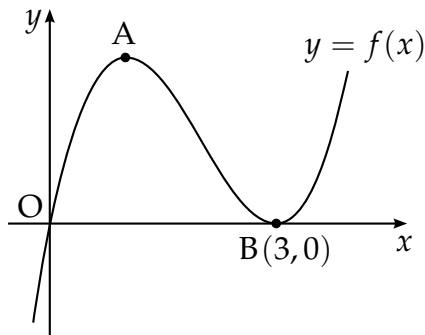


4

Part	Marks	Level	Calc.	Content	Answer	U2 OC3
	4	C	NC	T9	$\frac{63}{65}$	2000 P1 Q1

<ul style="list-style-type: none"> •¹ ss: know to use trig expansion •² pd: process missing sides •³ ic: interpret data •⁴ pd: process 	<ul style="list-style-type: none"> •¹ $\sin p \cos q + \cos p \sin q$ •² 10 and 13 •³ $\frac{8}{10} \cdot \frac{12}{13} + \frac{6}{10} \cdot \frac{5}{13}$ •⁴ $\frac{126}{130}$
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- [SQA] 2. A sketch of the graph of $y = f(x)$ where $f(x) = x^3 - 6x^2 + 9x$ is shown below.
The graph has a maximum at A and a minimum at B(3,0).

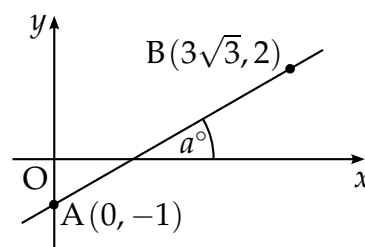


- (a) Find the coordinates of the turning point at A. 4
- (b) Hence sketch the graph of $y = g(x)$ where $g(x) = f(x + 2) + 4$.
Indicate the coordinates of the turning points. There is no need to calculate the coordinates of the points of intersection with the axes. 2
- (c) Write down the range of values of k for which $g(x) = k$ has 3 real roots. 1

Part	Marks	Level	Calc.	Content	Answer	U1 OC3
(a)	4	C	NC	C8	A(1,4)	2000 P1 Q2
(b)	2	C	NC	A3	sketch (translate 4 up, 2 left)	
(c)	1	A/B	NC	A2	$4 < k < 8$	

<ul style="list-style-type: none"> •¹ ss: know to differentiate •² pd: differentiate correctly •³ ss: know gradient = 0 •⁴ pd: process •⁵ ic: interpret transformation •⁶ ic: interpret transformation •⁷ ic: interpret sketch 	<ul style="list-style-type: none"> •¹ $\frac{dy}{dx} = \dots$ •² $\frac{dy}{dx} = 3x^2 - 12x + 9$ •³ $3x^2 - 12x + 9 = 0$ •⁴ $A = (1,4)$ <p>translate $f(x)$ 4 units up, 2 units left</p> <ul style="list-style-type: none"> •⁵ sketch with coord. of $A'(-1,8)$ •⁶ sketch with coord. of $B'(1,4)$ •⁷ $4 < k < 8$ (accept $4 \leq k \leq 8$)
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- [SQA] 3. Find the size of the angle a° that the line joining the points $A(0, -1)$ and $B(3\sqrt{3}, 2)$ makes with the positive direction of the x -axis.



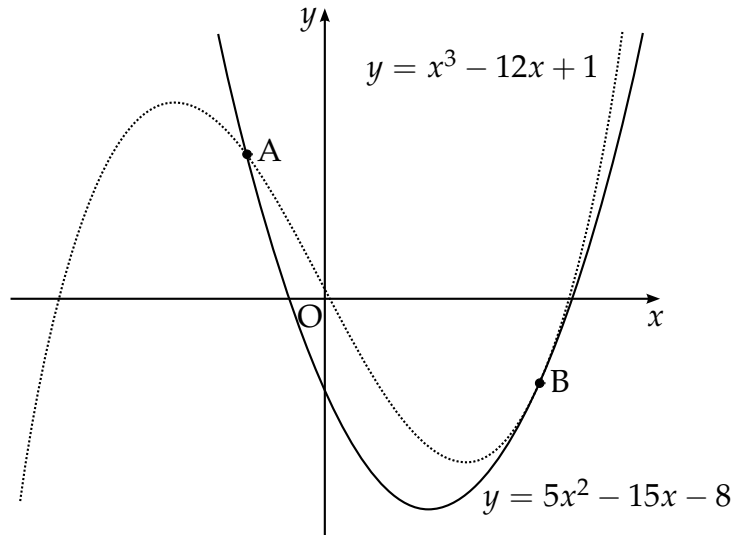
3

Part	Marks	Level	Calc.	Content	Answer	U1 OC1
	3	C	NC	G2	30	2000 P1 Q3

<ul style="list-style-type: none"> •¹ ss: know how to find gradient or equ. •² pd: process •³ ic: interpret exact value 	<ul style="list-style-type: none"> •¹ $\frac{2-(-1)}{3\sqrt{3}-0}$ •² $\tan a = \text{gradient}$ <i>stated or implied by</i> •³ $a = 30$
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- [SQA] 4. The diagram shows a sketch of the graphs of $y = 5x^2 - 15x - 8$ and $y = x^3 - 12x + 1$.

The two curves intersect at A and touch at B, i.e. at B the curves have a common tangent.



- (a) (i) Find the x -coordinates of the point of the curves where the gradients are equal. 4
- (ii) By considering the corresponding y -coordinates, or otherwise, distinguish geometrically between the two cases found in part (i). 1
- (b) The point A is $(-1, 12)$ and B is $(3, -8)$. 5
- Find the area enclosed between the two curves.

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
(ai)	4	C	NC	C4	$x = \frac{1}{3}$ and $x = 3$	2000 P1 Q4
(aii)	1	C	NC	CGD	parallel and coincident	
(b)	5	C	NC	C17	$21\frac{1}{3}$	

<ul style="list-style-type: none"> •¹ ss: know to diff. and equate •² pd: differentiate •³ pd: form equation •⁴ ic: interpret solution •⁵ ic: interpret diagram •⁶ ss: know how to find area between curves •⁷ ic: interpret limits •⁸ pd: form integral •⁹ pd: process integration •¹⁰ pd: process limits 	<ul style="list-style-type: none"> •¹ find derivatives and equate •² $3x^2 - 12$ and $10x - 15$ •³ $3x^2 - 10x + 3 = 0$ •⁴ $x = 3, x = \frac{1}{3}$ •⁵ tangents at $x = \frac{1}{3}$ are parallel, at $x = 3$ coincident •⁶ $\int(\text{cubic} - \text{parabola})$ or $\int(\text{cubic}) - \int(\text{parabola})$ •⁷ $\int_{-1}^3 \dots dx$ •⁸ $\int(x^3 - 5x^2 + 3x + 9)dx$ or equiv. •⁹ $[\frac{1}{4}x^4 - \frac{5}{3}x^3 + \frac{3}{2}x^2 + 9x]_{-1}^3$ or equiv. •¹⁰ $21\frac{1}{3}$
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- [SQA] 5. Two sequences are generated by the recurrence relations $u_{n+1} = au_n + 10$ and $v_{n+1} = a^2v_n + 16$.

The two sequences approach the same limit as $n \rightarrow \infty$.

Determine the value of a and evaluate the limit.

5

Part	Marks	Level	Calc.	Content	Answer	U1 OC4
	4	C	NC	A13	$a = \frac{3}{5}, L = 25$	2000 P1 Q5
	1	A/B	NC	A12		

<ul style="list-style-type: none"> •¹ ss: know how to find limit •² pd: process •³ pd: process •⁴ ic: interpret coeff. of u_n •⁵ pd: process 	<ul style="list-style-type: none"> •¹ $L = aL + 10$ or $L = a^2L + 16$ or $L = \frac{b}{1-a}$ •² $L = \frac{10}{1-a}$ or $L = \frac{16}{1-a^2}$ •³ $\frac{10}{1-a}$ or $\frac{16}{1-a^2}$ •⁴ $10a^2 - 16a + 6 = 0$ •⁵ $a = \frac{3}{5}$ and $L = 25$
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- [SQA] 6. For what range of values of k does the equation $x^2 + y^2 + 4kx - 2ky - k - 2 = 0$ represent a circle?

5

Part	Marks	Level	Calc.	Content	Answer	U2 OC4
	5	A	NC	G9, A17	for all k	2000 P1 Q6

<ul style="list-style-type: none"> •¹ ss: know to examine radius •² pd: process •³ pd: process •⁴ ic: interpret quadratic inequation •⁵ ic: interpret quadratic inequation 	<ul style="list-style-type: none"> •¹ $g = 2k, f = -k, c = -k - 2$ <i>stated or implied by</i> •² •² $r^2 = 5k^2 + k + 2$ •³ (real $r \Rightarrow$) $5k^2 + k + 2 > 0$ (<i>accept</i> \geq) •⁴ use discr. or complete sq. or diff. •⁵ true for all k
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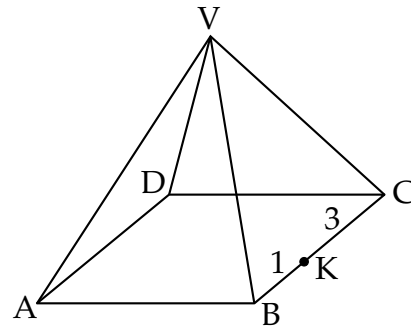
[SQA] 7. VABCD is a pyramid with a rectangular base ABCD.

Relative to some appropriate axes,

$$\vec{VA} \text{ represents } -7\mathbf{i} - 13\mathbf{j} - 11\mathbf{k}$$

$$\vec{AB} \text{ represents } 6\mathbf{i} + 6\mathbf{j} - 6\mathbf{k}$$

$$\vec{AD} \text{ represents } 8\mathbf{i} - 4\mathbf{j} + 4\mathbf{k}.$$



K divides BC in the ratio 1 : 3.

Find \vec{VK} in component form.

3

Part	Marks	Level	Calc.	Content	Answer	U3 OC1
	3	C	CN	G25, G21, G20	$\begin{pmatrix} 1 \\ -8 \\ -16 \end{pmatrix}$	2000 P1 Q7

<ul style="list-style-type: none"> •¹ ss: recognise crucial aspect •² ic: interpret ratio •³ pd: process components 	<ul style="list-style-type: none"> •¹ $\vec{VK} = \vec{VA} + \vec{AB} + \vec{BK}$ or $\vec{VK} = \vec{VB} + \vec{BK}$ •² $\vec{BK} = \frac{1}{4}\vec{BC}$ or $\frac{1}{4}\vec{AD}$ or $\begin{pmatrix} 2 \\ -1 \\ 1 \end{pmatrix}$ or $\begin{pmatrix} -1 \\ -7 \\ -17 \end{pmatrix}$ •³ $\vec{VK} = \begin{pmatrix} 1 \\ -8 \\ -16 \end{pmatrix}$
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[SQA] 8. The graph of $y = f(x)$ passes through the point $(\frac{\pi}{9}, 1)$.

If $f'(x) = \sin(3x)$ express y in terms of x .

4

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	4	A/B	NC	C18, C23	$y = -\frac{1}{3}\cos(3x) + \frac{7}{6}$	2000 P1 Q8

<ul style="list-style-type: none"> •¹ ss: know to integrate •² pd: integrate •³ ic: interpret $(\frac{\pi}{9}, 1)$ •⁴ pd: process 	<ul style="list-style-type: none"> •¹ $y = \int \sin(3x) dx$ stated or implied by •² $-\frac{1}{3}\cos(3x)$ •³ $1 = -\frac{1}{3}\cos(\frac{3\pi}{9}) + c$ or equiv. •⁴ $c = \frac{7}{6}$
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[SQA] 9. Evaluate $\log_5 2 + \log_5 50 - \log_5 4$.

3

Part	Marks	Level	Calc.	Content	Answer	U3 OC3
	2	C	NC	A28	2	2000 P1 Q9
	1	A/B	NC	A28		

<ul style="list-style-type: none"> •¹ pd: use $\log_a x + \log_a y = \log_a xy$ •² pd: use $\log_a x - \log_a y = \log_a \frac{x}{y}$ •³ pd: use $\log_a a = 1$ 	<ul style="list-style-type: none"> •¹ $\log_5 100 - \log_5 4$ •² $\log_5 25$ •³ 2
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[SQA] 10. Find the maximum value of $\cos x - \sin x$ and the value of x for which it occurs in the interval $0 \leq x \leq 2\pi$.

6

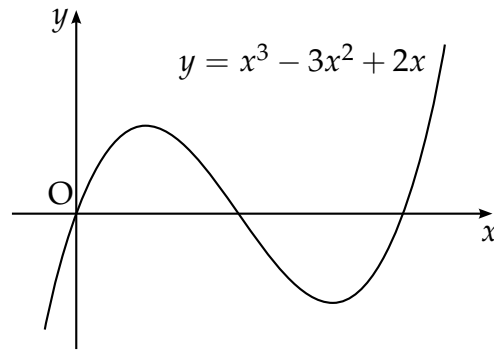
Part	Marks	Level	Calc.	Content	Answer	U3 OC4
	6	A/B	CN	T14	max value $\sqrt{2}$ when $x = \frac{7\pi}{4}$	2000 P1 Q10

<ul style="list-style-type: none"> •¹ ss: use e.g. $k \cos(x + a)$ •² ic: expand chosen rule •³ pd: compare coefficients •⁴ pd: process •⁵ pd: process •⁶ ic: interpret trig expression 	<ul style="list-style-type: none"> •¹ e.g. use $k \cos(x + a)$ •² $k \cos x \cos a - k \sin x \sin a$ •³ $k \cos a = 1$ and $k \sin a = 1$ •⁴ $k = \sqrt{2}$ •⁵ $\tan a = 1, a = \frac{\pi}{4}$ (<i>45° is bad form</i>) •⁶ max. value = $\sqrt{2}$ when $x = \frac{7\pi}{4}$ (<i>do not accept 45°</i>)
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[END OF QUESTIONS]

Higher 2000 - Paper 2 Solutions

[SQA] 1. The diagram shows a sketch of the graph of $y = x^3 - 3x^2 + 2x$.



(a) Find the equation of the tangent to this curve at the point where $x = 1$.

5

(b) The tangent at the point $(2, 0)$ has equation $y = 2x - 4$. Find the coordinates of the point where this tangent meets the curve again.

5

Part	Marks	Level	Calc.	Content	Answer	U2 OC1
(a)	5	C	CN	C5	$x + y = 1$	2000 P2 Q1
(b)	5	C	CN	A23, A22, A21	$(-1, -6)$	

<ul style="list-style-type: none"> •¹ ss: know to differentiate •² pd: differentiate correctly •³ ss: know that gradient = $f'(1)$ •⁴ ss: know that y-coord = $f(1)$ •⁵ ic: state equ. of line •⁶ ss: equate equations •⁷ pd: arrange in standard form •⁸ ss: know how to solve cubic •⁹ pd: process •¹⁰ ic: interpret 	<ul style="list-style-type: none"> •¹ $y' = \dots$ •² $3x^2 - 6x + 2$ •³ $y'(1) = -1$ •⁴ $y(1) = 0$ •⁵ $y - 0 = -1(x - 1)$ •⁶ $2x - 4 = x^3 - 3x^2 + 2x$ •⁷ $x^3 - 3x^2 + 4 = 0$ •⁸ <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">1</td> <td style="padding: 0 5px;">-3</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">4</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> <td style="padding: 0 5px;">...</td> </tr> </table> •⁹ identify $x = -1$ from working •¹⁰ $(-1, -6)$ 	1	-3	0	4
1	-3	0	4										
...										
...										

[SQA] 2. (a) Find the equation of AB, the perpendicular bisector of the line joining the points P(-3,1) and Q(1,9).

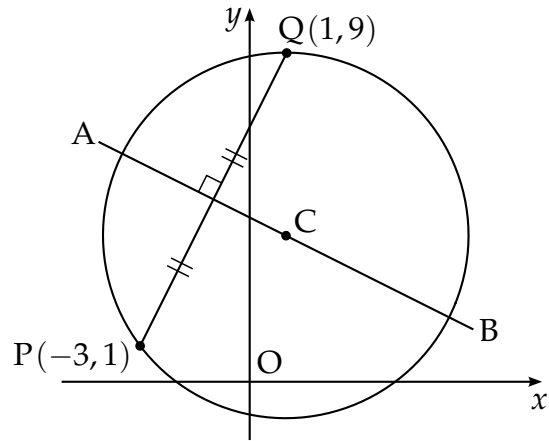
(b) C is the centre of a circle passing through P and Q. Given that QC is parallel to the y-axis, determine the equation of the circle.

(c) The tangents at P and Q intersect at T.

Write down

(i) the equation of the tangent at Q

(ii) the coordinates of T.



4

3

2

Part	Marks	Level	Calc.	Content	Answer	U2 OC4
(a)	4	C	CN	G7	$x + 2y = 9$	2000 P2 Q2
(b)	3	C	CN	G10	$(x - 1)^2 + (y - 4)^2 = 25$	
(c)	2	C	CN	G11, G8	(i) $y = 9$, (ii) T(-9, 9)	

<ul style="list-style-type: none"> •¹ ss: know to use midpoint •² pd: process gradient of PQ •³ ss: know how to find perp. gradient •⁴ ic: state equ. of line •⁵ ic: interpret "parallel to y-axis" •⁶ pd: process radius •⁷ ic: state equ. of circle •⁸ ic: interpret diagram •⁹ ss: know to use equ. of AB 	<ul style="list-style-type: none"> •¹ midpoint = (-1, 5) •² $m_{PQ} = \frac{9-1}{1-(-1)}$ •³ $m_{\perp} = -\frac{1}{2}$ •⁴ $y - 5 = -\frac{1}{2}(x - (-1))$ •⁵ $y_C = 4$ stated or implied by •⁷ •⁶ radius = 5 or equiv. stated or implied by •⁷ •⁷ $(x - 1)^2 + (y - 4)^2 = 25$ •⁸ $y = 9$ •⁹ T = (-9, 9)
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[SQA] 3. $f(x) = 3 - x$ and $g(x) = \frac{3}{x}, x \neq 0$.

(a) Find $p(x)$ where $p(x) = f(g(x))$. 2

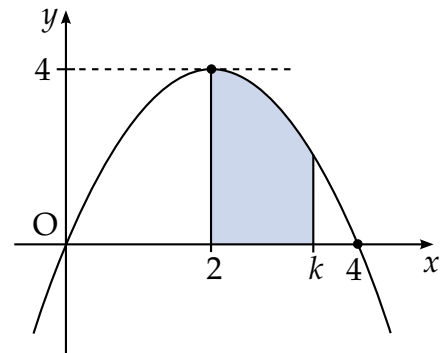
(b) If $q(x) = \frac{3}{3-x}, x \neq 3$, find $p(q(x))$ in its simplest form. 3

Part	Marks	Level	Calc.	Content	Answer	U1 OC2
(a)	2	C	CN	A4	$3 - \frac{3}{x}$	2000 P2 Q3
(b)	2	C	CN	A4	x	
(b)	1	A/B	CN	A4		

<ul style="list-style-type: none"> •¹ ic: interpret composite func. •² pd: process •³ ic: interpret composite func. •⁴ pd: process •⁵ pd: process 	<ul style="list-style-type: none"> •¹ $f\left(\frac{3}{x}\right)$ stated or implied by •² •² $3 - \frac{3}{x}$ •³ $p\left(\frac{3}{3-x}\right)$ stated or implied by •⁴ •⁴ $3 - \frac{3}{\frac{3}{3-x}}$ •⁵ x
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[SQA] 4. The parabola shown crosses the x -axis at $(0, 0)$ and $(4, 0)$, and has a maximum at $(2, 4)$.

The shaded area is bounded by the parabola, the x -axis and the lines $x = 2$ and $x = k$.



(a) Find the equation of the parabola. 2

(b) Hence show that the shaded area, A , is given by

$$A = -\frac{1}{3}k^3 + 2k^2 - \frac{16}{3}.$$
3

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
(a)	2	C	CN	A19	$y = 4x - x^2$	2000 P2 Q4
(b)	3	C	CN	C16	proof	

<ul style="list-style-type: none"> •¹ ic: state standard form •² pd: process for x^2 coeff. •³ ss: know to integrate •⁴ pd: integrate correctly •⁵ pd: process limits and complete proof 	<ul style="list-style-type: none"> •¹ $ax(x - 4)$ •² $a = -1$ •³ \int_2^k (function from (a)) •⁴ $-\frac{1}{3}x^3 + 2x^2$ •⁵ $-\frac{1}{3}k^3 + 2k^2 - \left(-\frac{8}{3} + 8\right)$
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[SQA] 5. Solve the equation $3 \cos 2x^\circ + \cos x^\circ = -1$ in the interval $0 \leq x \leq 360$.

5

Part	Marks	Level	Calc.	Content	Answer	U2 OC3
	5	A/B	CR	T10	60, 131.8, 228.2, 300	2000 P2 Q5
<ul style="list-style-type: none"> •¹ ss: know to use $\cos 2x = 2 \cos^2 x - 1$ •² pd: process •³ ss: know to/and factorise quadratic •⁴ pd: process •⁵ pd: process 				<ul style="list-style-type: none"> •¹ $3(2 \cos^2 x^\circ - 1)$ •² $6 \cos^2 x^\circ + \cos x^\circ - 2 = 0$ •³ $(2 \cos x^\circ - 1)(3 \cos x^\circ + 2)$ •⁴ $\cos x^\circ = \frac{1}{2}, x = 60, 30$ •⁵ $\cos x^\circ = -\frac{2}{3}, x = 132, 228$ 		

[SQA] 6. A goldsmith has built up a solid which consists of a triangular prism of fixed volume with a regular tetrahedron at each end.

The surface area, A , of the solid is given by

$$A(x) = \frac{3\sqrt{3}}{2} \left(x^2 + \frac{16}{x} \right)$$

where x is the length of each edge of the tetrahedron.

Find the value of x which the goldsmith should use to minimise the amount of gold plating required to cover the solid.



6

Part	Marks	Level	Calc.	Content	Answer	U1 OC3										
	6	A/B	CN	C11	$x = 2$	2000 P2 Q6										
<ul style="list-style-type: none"> •¹ ss: know to differentiate •² pd: process •³ ss: know to set $f'(x) = 0$ •⁴ pd: deal with x^{-2} •⁵ pd: process •⁶ ic: check for minimum 				<ul style="list-style-type: none"> •¹ $A'(x) = \dots$ •² $\frac{3\sqrt{3}}{2}(2x - 16x^{-2})$ or $3\sqrt{3}x - 24\sqrt{3}x^{-2}$ •³ $A'(x) = 0$ •⁴ $-\frac{16}{x^2}$ or $-\frac{24\sqrt{3}}{x^2}$ •⁵ $x = 2$ •⁶ <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">x</td> <td style="padding: 0 5px;"> </td> <td style="padding: 0 5px;">2^-</td> <td style="padding: 0 5px;">2</td> <td style="padding: 0 5px;">2^+</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 0 5px;">$A'(x)$</td> <td style="padding: 0 5px;"> </td> <td style="padding: 0 5px;">$-ve$</td> <td style="padding: 0 5px;">0</td> <td style="padding: 0 5px;">$+ve$</td> </tr> </table> <p style="text-align: center;">so $x = 2$ is min.</p> 			x		2^-	2	2^+	$A'(x)$		$-ve$	0	$+ve$
x		2^-	2	2^+												
$A'(x)$		$-ve$	0	$+ve$												

- [SQA] 7. For what value of t are the vectors $\mathbf{u} = \begin{pmatrix} t \\ -2 \\ 3 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 2 \\ 10 \\ t \end{pmatrix}$ perpendicular? 2

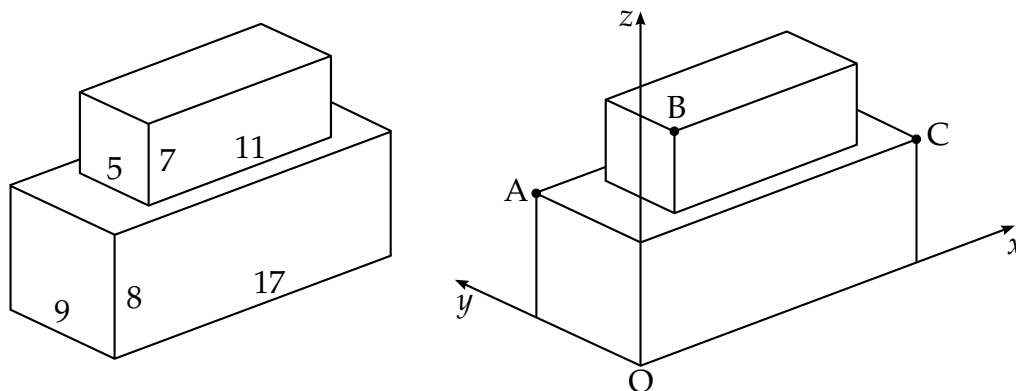
Part	Marks	Level	Calc.	Content	Answer	U3 OC1	
	2	C	CN	G27	$t = 4$	2000 P2 Q7	
				<ul style="list-style-type: none"> •¹ ss: know to use scalar product •² ic: interpret scalar product 	<ul style="list-style-type: none"> •¹ $\mathbf{u} \cdot \mathbf{v} = 2t - 20 + 3t$ •² $\mathbf{u} \cdot \mathbf{v} = 0 \Rightarrow t = 4$ 		

- [SQA] 8. Given that $f(x) = (5x - 4)^{\frac{1}{2}}$, evaluate $f'(4)$. 3

Part	Marks	Level	Calc.	Content	Answer	U3 OC2	
	1	C	CN	C21	$\frac{5}{8}$	2000 P2 Q8	
	2	A/B	CN	C21			
				<ul style="list-style-type: none"> •¹ pd: differentiate power •² pd: differentiate 2nd function •³ pd: evaluate $f'(x)$ 	<ul style="list-style-type: none"> •¹ $\frac{1}{2}(5x - 4)^{-\frac{1}{2}}$ •² $\times 5$ •³ $f'(4) = \frac{5}{8}$ 		

- [SQA] 9. A cuboid measuring 11 cm by 5 cm by 7 cm is placed centrally on top of another cuboid measuring 17 cm by 9 cm by 8 cm.

Coordinates axes are taken as shown.



- (a) The point A has coordinates $(0, 9, 8)$ and C has coordinates $(17, 0, 8)$.

Write down the coordinates of B.

1

- (b) Calculate the size of angle ABC.

6

Part	Marks	Level	Calc.	Content	Answer	U3 OC1
(a)	1	C	CN	G22	$B(3, 2, 15)$	2000 P2 Q9
(b)	6	C	CR	G28	92.5°	

•¹ ic: interpret 3-d representation

•² ss: know to use scalar product

•³ pd: process vectors

•⁴ pd: process vectors

•⁵ pd: process lengths

•⁶ pd: process scalar product

•⁷ pd: evaluate scalar product

•¹ $B = (3, 2, 15)$ treat $\begin{pmatrix} 3 \\ 2 \\ 15 \end{pmatrix}$ as bad form

•² $\cos \widehat{ABC} = \frac{\vec{BA} \cdot \vec{BC}}{|\vec{BA}| |\vec{BC}|}$

•³ $\vec{BA} = \begin{pmatrix} -3 \\ 7 \\ -7 \end{pmatrix}$

•⁴ $\vec{BC} = \begin{pmatrix} 14 \\ -2 \\ -7 \end{pmatrix}$

•⁵ $|\vec{BA}| = \sqrt{107}, |\vec{BC}| = \sqrt{249}$

•⁶ $\vec{BA} \cdot \vec{BC} = -7$

•⁷ $\widehat{ABC} = 92.5^\circ$

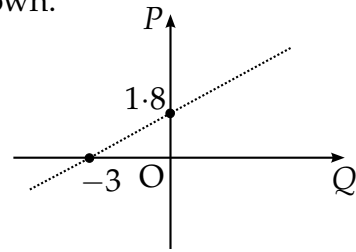
[SQA] 10. Find $\int \frac{1}{(7-3x)^2} dx$.

2

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	2	A/B	CN	C22, C14	$\frac{1}{3(7-3x)} + c$	2000 P2 Q10
<ul style="list-style-type: none"> •¹ pd: integrate function •² pd: deal with function of function 					<ul style="list-style-type: none"> •¹ $\frac{1}{-1}(7-3x)^{-1}$ •² $\times \frac{1}{-3}$ 	

[SQA] 11. The results of an experiment give rise to the graph shown.

(a) Write down the equation of the line in terms of P and Q .



2

It is given that $P = \log_e p$ and $Q = \log_e q$.

(b) Show that p and q satisfy a relationship of the form $p = aq^b$, stating the values of a and b .

4

Part	Marks	Level	Calc.	Content	Answer	U3 OC3
(a)	2	A/B	CR	G3	$P = 0.6Q + 1.8$	2000 P2 Q11
(b)	4	A/B	CR	A33	$a = 6.05, b = 0.6$	

<ul style="list-style-type: none"> •¹ ic: interpret gradient •² ic: state equ. of line •³ ic: interpret straight line •⁴ ss: know how to deal with x of $x \log y$ •⁵ ss: know how to express number as log •⁶ ic: interpret sum of two logs 	<ul style="list-style-type: none"> •¹ $m = \frac{1.8}{3} = 0.6$ •² $P = 0.6Q + 1.8$ <p>Method 1</p> <ul style="list-style-type: none"> •³ $\log_e p = 0.6 \log_e q + 1.8$ •⁴ $\log_e q^{0.6}$ •⁵ $\log_e 6.05$ •⁶ $p = 6.05q^{0.6}$ <p>Method 2</p> <p>$\ln p = \ln aq^b$</p> <ul style="list-style-type: none"> •³ $\ln p = \ln a + b \ln q$ •⁴ $\ln p = 0.6 \ln q + 1.8$ <i>stated or implied by •⁵ or •⁶</i> •⁵ $\ln a = 1.8$ •⁶ $a = 6.05, b = 0.6$
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[END OF QUESTIONS]