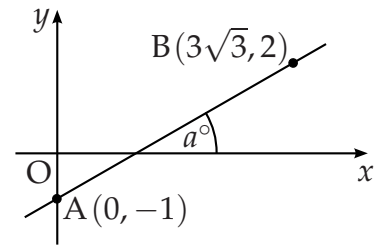


$m = \tan x$

- [SQA] 1. 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.



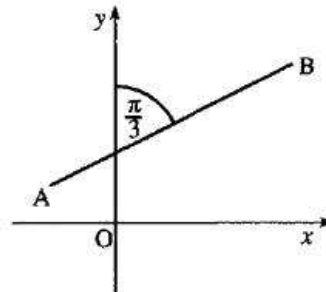
3

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

- ¹ ss: know how to find gradient or equ.
- ² pd: process
- ³ ic: interpret exact value

- ¹ $\frac{2-(-1)}{3\sqrt{3}-0}$
- ² $\tan a = \text{gradient}$ *stated or implied by*
- ³ $a = 30$

- [SQA] 2. The line AB makes an angle of $\frac{\pi}{3}$ radians with the y -axis, as shown in the diagram. Find the exact value of the gradient of AB.



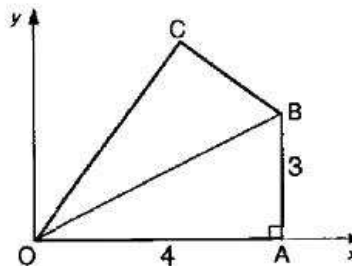
2

Part	Marks	Level	Calc.	Content	Answer	U1 OC1
	2	A/B	CN	G2		1999 P1 Q7

- ¹ "correct angle" = $\frac{\pi}{2} - \frac{\pi}{3}$
- ² $\frac{1}{\sqrt{3}}$

[SQA]

3. The diagram shows a kite OABC.
A is the point (4,0) and B is the point (4,3).
Calculate the gradient of OC correct to two decimal places.



3

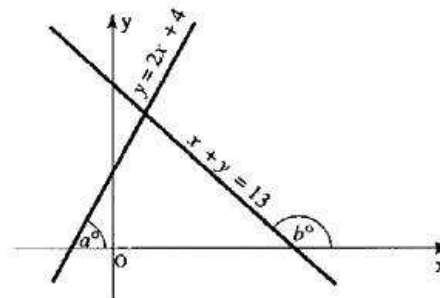
Part	Marks	Level	Calc.	Content	Answer	U1 OC1
	3	C	CR	G2		1992 P1 Q13

- ¹ *strat:* i.e. try to evaluate $\hat{C}OA$
- ² $\hat{A}OB = 36.9^\circ$
- ³ $\tan 73.7^\circ = 3.428$
- ⁴ $\times \cos x$

[SQA]

4. The lines $y = 2x + 4$ and $x + y = 13$ make angles of a° and b° with the positive direction of the x -axis, as shown in the diagram.

- (a) Find the values of a and b .
(b) Hence find the acute angle between the two given lines.



4

1

Part	Marks	Level	Calc.	Content	Answer	U1 OC1
(a)	4	C	CR	G2		1993 P1 Q10
(b)	1	C	CR	CGD		

- ¹ $\tan a^\circ = 2$
- ² $a = 63.4^\circ$
- ³ $\tan(180 - b) = 1$
- ⁴ $b = 135$
- ⁵ $180 - a - (180 - b)$ or equiv. to $b - a$

5. Calculate, to the nearest degree, the angle between the x -axis and the tangent to the curve with equation $y = x^3 - 4x - 5$ at the point where $x = 2$.

Part	Marks	Level	Calc.	Content	Answer	U1 OC3
	4	C	NC	C4, G2		1989 P1 Q13

•¹ $\frac{dy}{dx} = 3x^2 - 4$

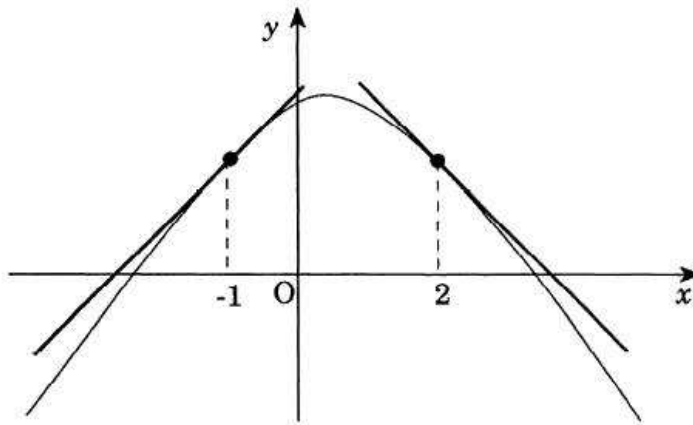
•² $\frac{dy}{dx}_{x=2} = 8$

•³ $\tan \theta = 8$

•⁴ 83°

[SQA]

6. The parabola $y = ax^2 + bx + c$ crosses the y -axis at $(0, 3)$ and has two tangents drawn, as shown in the diagram.



The tangent at $x = -1$ makes an angle of 45° with the positive direction of the x -axis and the tangent at $x = 2$ makes an angle of 135° with the positive direction of the x -axis.

Find the values of a , b and c .

(8)

Part	Marks	Level	Calc.	Content	Answer	U2 OC1
	2	C	NC	G2, A2		1995 P2 Q7
	6	A/B	NC	G2, A2		

- ¹ $c = 3$
- ² $2ax + b$
- ³ $m = \tan 45^\circ = 1$
- ⁴ $-2a + b = 1$
- ⁵ $m = \tan 135^\circ = -1$
- ⁶ $4a + b = -1$
- ⁷ method for solving pr. of equ
- ⁸ $a = -\frac{1}{3}, b = \frac{1}{3}$

[END OF QUESTIONS]