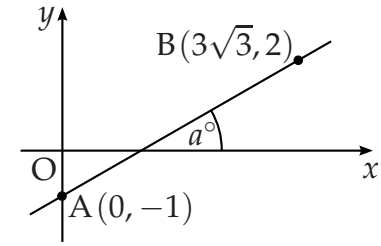
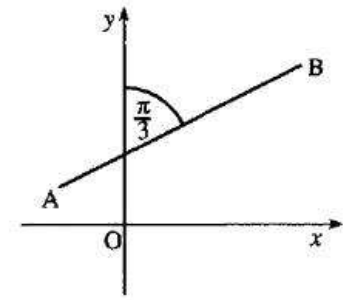
m = tan x

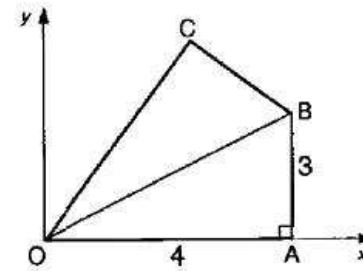
[SQA] 1. Find the size of the angle a° that the line joining the points $A(0,-1)$ and $B(3\sqrt{3},2)$ makes with the positive direction of the x-axis. **3**



[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**

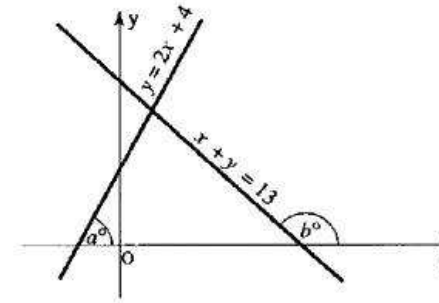


[SQA] 3. **The diagram shows a kite OABC.**
A is the point (4,0) and B is the point (4,3).
Calculate the gradient of OC correct to two decimal places. **3**



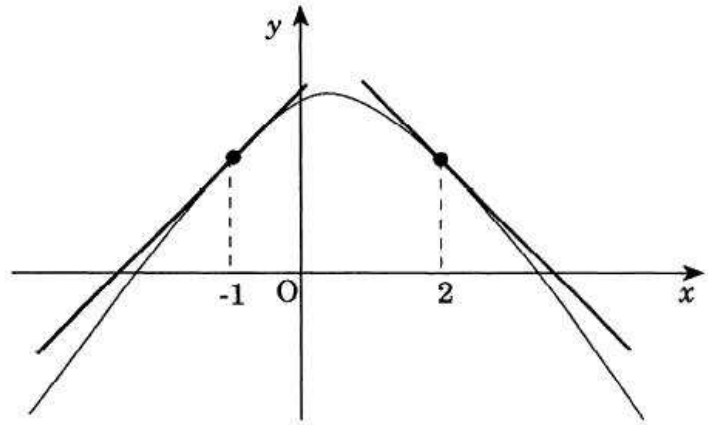
[SQA] 4. **The lines $y = 2x + 4$ and $x + y = 13$ make angles of $a°$ and $b°$ with the positive direction of the x-axis, as shown in the diagram.**

(a) Find the values of a and b. **4**
(b) Hence find the acute angle between the two given lines. **1**



[SQA] 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 $x = 2$. **4**

[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)**

[END OF QUESTIONS]