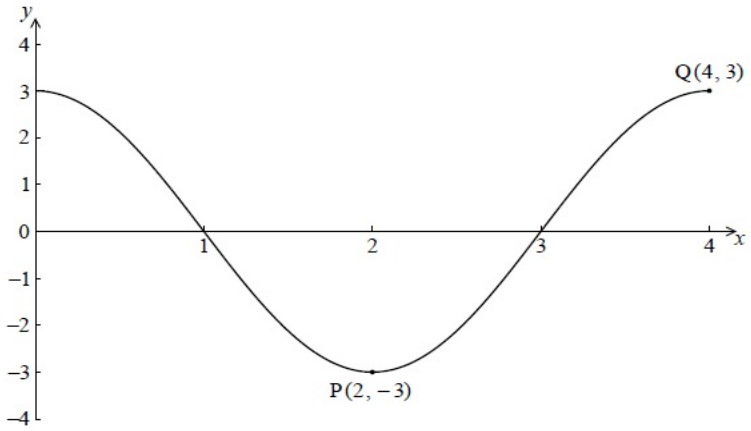
BECA / Huson / 12.1 IB Math SL Name:
3.4 Spiral Review Periodic Function Trig (No Calculator, Paper 1)

3.4 Periodic-functions, trigonometry (Paper 1, without calculator)

1a. The following diagram shows the graph of $f(x) = a\cos(bx)$, for $0 \leq x \leq 4$.



There is a minimum point at P(2, – 3) and a maximum point at Q(4, 3) .

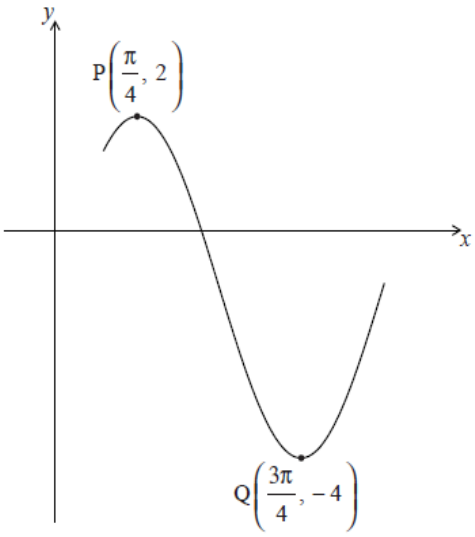
(i) Write down the value of *a*.

(ii) Find the value of *b*. *[3 marks]*

1b. Write down the gradient of the curve at P. *[1 mark]*

1c. Write down the equation of the normal to the curve at P. *[2 marks]*

2a. The diagram below shows part of the graph of $f(x) = a\cos(b(x-c)) - 1$, where $a > 0$.



The point $\mathrm{P}\left(\frac{\pi}{4}, 2\right)$ is a maximum point and the point $\mathrm{Q}\left(\frac{3\pi}{4}, -4\right)$ is a minimum point.

Find the value of *a*. *[2 marks]*

2b. (i) Show that the period of f is π.

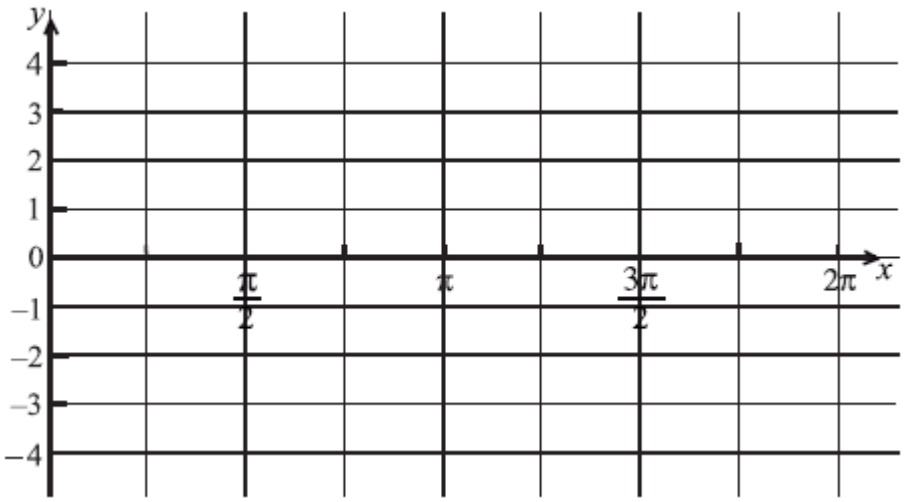
(ii) Hence, find the value of b. *[4 marks]*

2c. Given that $0 < c < \pi$, write down the value of c. *[1 mark]*

3a. Consider $g(x) = 3\sin 2x$.

Write down the period of g. *[1 mark]*

3b. On the diagram below, sketch the curve of g, for $0 \leq x \leq 2\pi$.



[3 marks]

3c. Write down the number of solutions to the equation $g(x) = 2$, for $0 \leq x \leq 2\pi$. *[2 marks]*