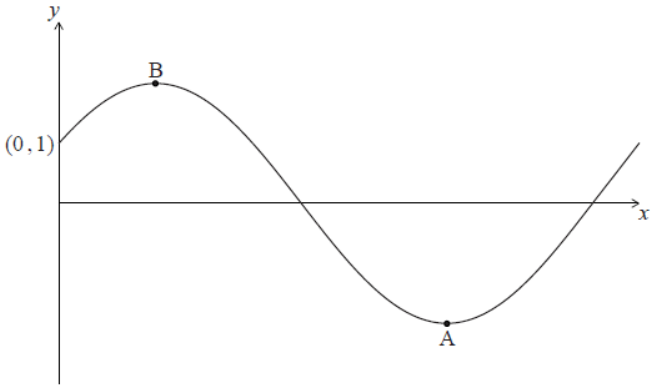


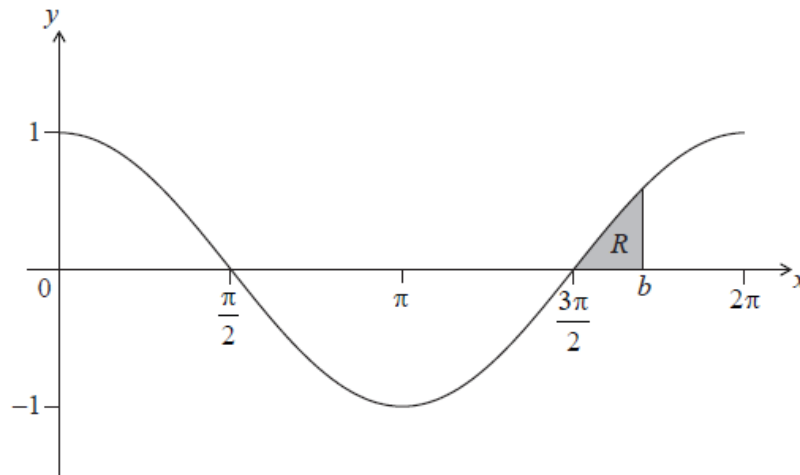
ANÁLISIS CON FUNCIONES TRIGONOMÉTRICAS

<p>1</p> <p>Muestra 2014 P1</p>	<p>Let $f(x) = \cos x + \sqrt{3} \sin x$, $0 \leq x \leq 2\pi$. The following diagram shows the graph of f.</p>  <p>The y-intercept is at $(0, 1)$, there is a minimum point at $A (p, q)$ and a maximum point at B.</p> <p>(a) Find $f'(x)$.</p> <p>(b) Hence</p> <p>(i) show that $q = -2$;</p> <p>(ii) verify that A is a minimum point.</p> <p>(c) Find the maximum value of $f(x)$.</p> <p>The function $f(x)$ can be written in the form $r \cos(x - a)$.</p> <p>(d) Write down the value of r and of a.</p>
<p>2</p> <p>Mayo 2014 TZ1 P2</p>	<p>The population of deer in an enclosed game reserve is modelled by the function $P(t) = 210 \sin(0.5t - 2.6) + 990$, where t is in months, and $t = 1$ corresponds to 1 January 2014.</p> <p>(a) Find the number of deer in the reserve on 1 May 2014.</p> <p>(b) (i) Find the rate of change of the deer population on 1 May 2014.</p> <p>(ii) Interpret the answer to part (i) with reference to the deer population size on 1 May 2014.</p>
<p>3</p> <p>Mayo 2014 TZ2 P1</p>	<p>El gráfico de una función h pasa por el punto $\left(\frac{\pi}{12}, 5\right)$.</p> <p>Sabiendo que $h'(x) = 4 \cos 2x$, halle $h(x)$.</p>

4

Mayo
2015
TZ1
P1

Let $f(x) = \cos x$, for $0 \leq x \leq 2\pi$. The following diagram shows the graph of f .
There are x -intercepts at $x = \frac{\pi}{2}, \frac{3\pi}{2}$.



The shaded region R is enclosed by the graph of f , the line $x = b$, where $b > \frac{3\pi}{2}$, and the x -axis. The area of R is $\left(1 - \frac{\sqrt{3}}{2}\right)$. Find the value of b .

5

Noviembre
2016
TZ2
P1

Sea $f'(x) = \operatorname{sen}^3(2x) \cos(2x)$. Halle $f(x)$, sabiendo que $f\left(\frac{\pi}{4}\right) = 1$.

6

Noviembre
2016
TZ2
P1

Sea $f(x) = \cos x$.

(a) (i) Halle las cuatro primeras derivadas de $f(x)$.

(ii) Halle $f^{(19)}(x)$.

Sea $g(x) = x^k$, donde $k \in \mathbb{Z}^+$.

(b) (i) Halle las tres primeras derivadas de $g(x)$.

(ii) Sabiendo que $g^{(19)}(x) = \frac{k!}{(k-p)!} (x^{k-19})$, halle p .

Sean $k = 21$ y $h(x) = (f^{(19)}(x) \times g^{(19)}(x))$.

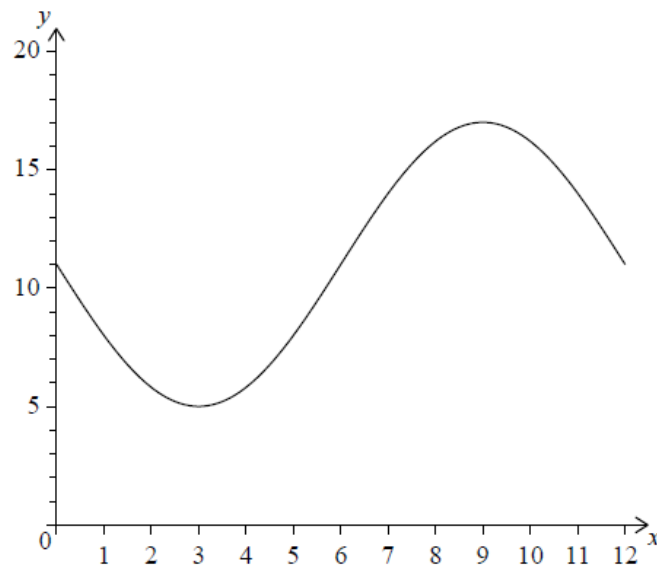
(c) (i) Halle $h'(x)$.

(ii) A partir de lo anterior, muestre que $h'(\pi) = \frac{-21!}{2} \pi^2$.

7

Noviembre
2016
TZ2
P2

La siguiente figura muestra el gráfico de $f(x) = a \operatorname{sen} bx + c$, para $0 \leq x \leq 12$.



El gráfico de f presenta un punto mínimo en $(3, 5)$ y un punto máximo en $(9, 17)$.

	<p>(a) (i) Halle el valor de c.</p> <p>(ii) Muestre que $b = \frac{\pi}{6}$.</p> <p>(iii) Halle el valor de a.</p> <p>El gráfico de g se obtiene a partir del gráfico de f mediante una traslación de $\begin{pmatrix} k \\ 0 \end{pmatrix}$.</p> <p>El punto máximo del gráfico de g tiene por coordenadas $(11,5; 17)$.</p> <p>(b) (i) Escriba el valor de k.</p> <p>(ii) Halle $g(x)$.</p> <p>El gráfico de g cambia de cóncavo hacia arriba a cóncavo hacia abajo cuando $x = w$.</p> <p>(c) (i) Halle w.</p> <p>(ii) A partir de lo anterior o de cualquier otro modo, halle la máxima razón de cambio positiva de g.</p>						
<p>8</p> <p>Mayo</p> <p>2017</p> <p>TZ1</p> <p>P1</p>	<p>The following table shows the probability distribution of a discrete random variable A, in terms of an angle θ.</p> <table border="1" data-bbox="574 926 1138 1024"> <tbody> <tr> <td>a</td> <td>1</td> <td>2</td> </tr> <tr> <td>$P(A = a)$</td> <td>$\cos \theta$</td> <td>$2 \cos 2\theta$</td> </tr> </tbody> </table> <p>(a) Show that $\cos \theta = \frac{3}{4}$.</p> <p>(b) Given that $\tan \theta > 0$, find $\tan \theta$.</p> <p>(c) Let $y = \frac{1}{\cos x}$, for $0 < x < \frac{\pi}{2}$. The graph of y between $x = \theta$ and $x = \frac{\pi}{4}$ is rotated 360° about the x-axis. Find the volume of the solid formed.</p>	a	1	2	$P(A = a)$	$\cos \theta$	$2 \cos 2\theta$
a	1	2					
$P(A = a)$	$\cos \theta$	$2 \cos 2\theta$					