

EJERCICIOS DE COMPOSICIÓN DE FUNCIONES

1º) Dadas las funciones: $f(x)=2x+1$; $g(x)=x^2-3$ y $h(x)=(x-5)/2$, calcula

a) $(g \circ f)(x) = g(f(x)) = g(2x+1) = (2x+1)^2 - 3 = 4x^2 + 4x - 2$

b) $(f \circ g)(x) = f(g(x)) = f(x^2-3) = 2(x^2-3) + 1 = 2x^2 - 5$

c) $(h \circ g)(x) = h(g(x)) = h(x^2-3) = \frac{(x^2-3)-5}{2} = \frac{x^2-8}{2}$

d) $(h \circ f)(x) = h(f(x)) = h(2x+1) = \frac{(2x+1)-5}{2} = \frac{2x-4}{2} = x-2$

e) $(g \circ h)(x) = g(h(x)) = g\left(\frac{x-5}{2}\right) = \left(\frac{x-5}{2}\right)^2 - 3 = \frac{x^2-10x+25}{4} - 3 = \frac{x^2-10x+13}{4}$

f) $(h \circ g \circ f)(x) = h(g(f(x))) = h(4x^2+4x-2) = \frac{(4x^2+4x-2)-5}{2} = \frac{4x^2+4x-7}{2}$

g) $(f \circ g \circ h)(x) = f(g(h(x))) = f\left(\frac{x^2-10x+13}{4}\right) = 2 \cdot \frac{x^2-10x+13}{4} + 1 = \frac{x^2-10x+15}{2}$

2º) Dadas $f(x) = \sqrt{\cos x} - 2$ y $g(x) = \ln(x^2 - 4)$, calcula $(g \circ f)(x)$ y $(f \circ g)(x)$

a) $(g \circ f)(x) = g(\sqrt{\cos x} - 2) = \ln\left((\sqrt{\cos x} - 2)^2 - 4\right) = \ln(\cos x - 2\sqrt{\cos x})$

b) $(f \circ g)(x) = f(g(x)) = f(\ln(x^2-4)) = \sqrt{\cos[\ln(x^2-4)]} - 2$

3º) Completa la siguiente tabla

f(x)	g(x)	f(g(-2))	g(f(-3/4))	f(g(x))	g(f(x))
2x+3	5x+4				
4-3x	1-x				
x ²	-x+3				
x ² +1	x ² -2				
(x+1)/2	(x-1)/4				
2x ² -5				2x ² +12x+13	
	3x-2				30x-17

4º) Dadas las funciones $f(x) = \sin x$, $g(x) = x^2+1$ y $h(x) = \sqrt{x-1}$, calcula:

a) $(g \circ f)(x) = g(\sin x) = \sin^2 x + 1$

b) $(f \circ h)(x) = f(\sqrt{x-1}) = \sin(\sqrt{x-1})$

c) $(h \circ g)(x) = h(x^2+1) = \sqrt{(x^2+1)-1} = \sqrt{x^2+1-1} = \sqrt{x^2} = x$

d) $(g \circ h)(x) = g(\sqrt{x-1}) = (\sqrt{x-1})^2 + 1 = x-1+1 = x$

e) $(h \circ f \circ g)(x) = h(f(g(x))) = h(\sin(x^2+1)) = \sqrt{\sin(x^2+1)-1}$