# Calculus AB

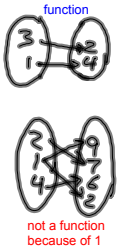
P-3

Functions

function - a rule or a map that assigns each value of the domain to exactly one value of the range

domain - set of all possible inputs

range - set of all possible outputs.




## Transformations

$y = a\,(bx - c) + d$

$y = -3(x-2)^3 + 3$

a → vertical stretch or compression

b → horizontal stretch or compression

c → horizontal translation $\left(-\frac{c}{b}\right)$

d → vertical translation

Evaluate the function. Determine its domain and range.

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27) $f(x) = \begin{cases} 2x+1, & x < 0 \\ 2x+2, & x \geq 0 \end{cases}$

domain : $\mathbb{R}$

range : $(-\infty, 1) \cup [2, \infty)$

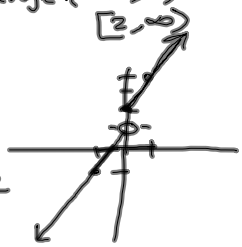
a) $f(-1) = 2(-1)+1 = -1$

b) $f(0) = 2(0)+2 = 2$

c) $f(2) = 2(2)+2 = 6$

d) $f(t^2+1) = 2(t^2+1)+2$

$= 2t^2+4$



Sketch a graph of the function and find its domain and range.

35) $f(x) = \sqrt{9 - x^2}$ $[-3, 3]$

$[0, 3]$

Determine whether $y$ is a function of $x$.

45) $x^2 + y^2 = 4$ no

Find the composite functions $(f \circ g)$ and $(g \circ f)$.
What is the domain of each composite function?
Are the two functions equal?

61) $f(x) = x^2$

$g(x) = \sqrt{x}$

$(F \circ g)(x) = F(g(x))$

$= F(\sqrt{x})$

$= (\sqrt{x})^2 = x$

$(g \circ F)(x) = g(F(x))$

$g(x^2) = \sqrt{x^2} = |x|$

Assignment:

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2-30 even
31 - 38 all, just domain and range,
41 - 54 all,
59 - 65 odd,
66, 70, 72,
97a, 97b, 98