Pre-Calculus

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نعرف طريق التفوق.. ونوصلكم اليه

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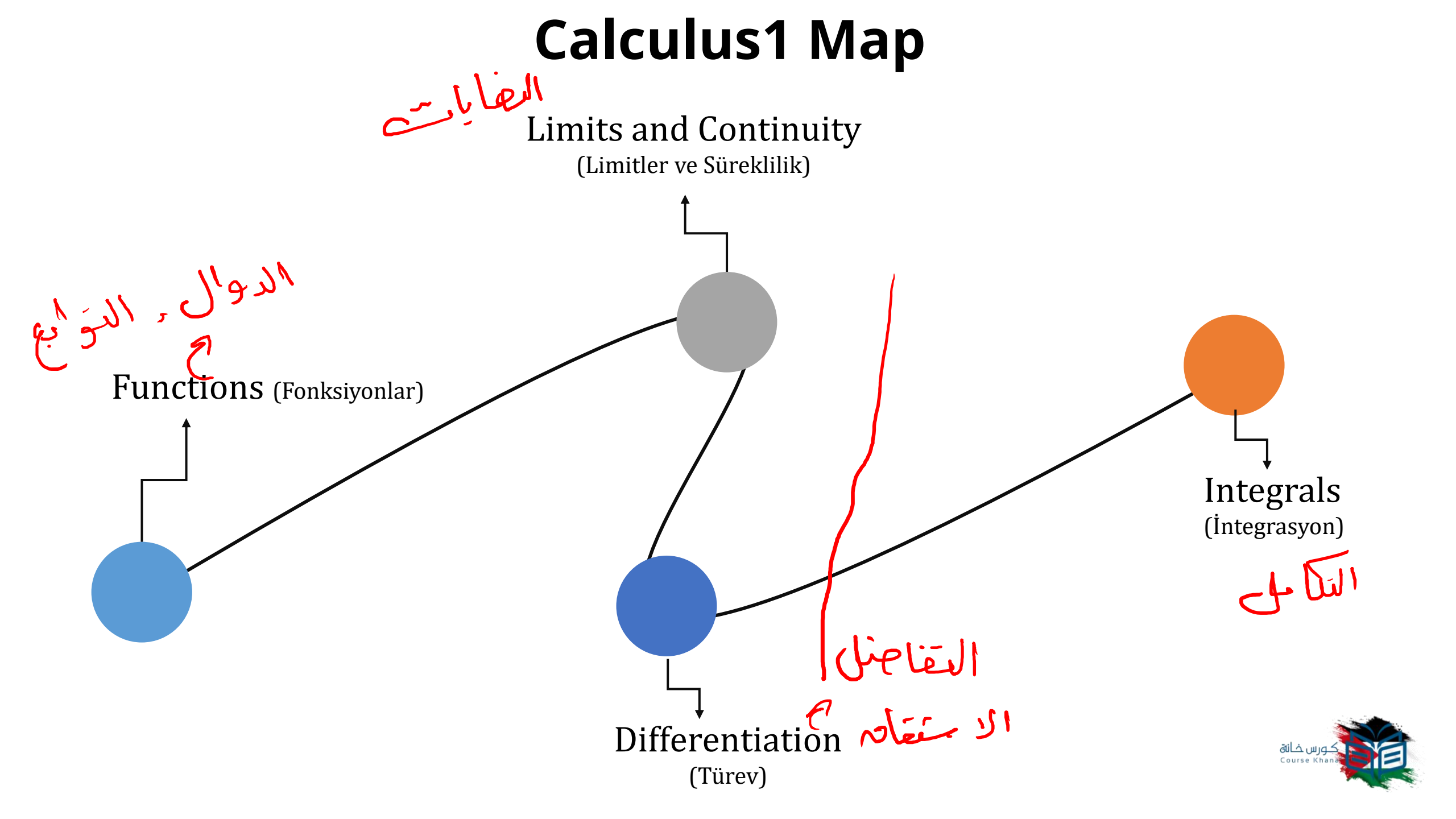
Calculus1 Map



Topics

- Functions and their graphs
- Domain and Range

Functions

$V = \frac{d}{t}$, $F = m \cdot a$ $y = f(x)$

$y = 100x \Rightarrow y = f(x)$

dependent variable / output / Range

independent variable / input / Domain

الدالة هى علاقة بين متغيرات

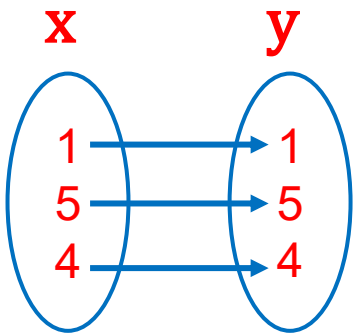
Profit = 100 x Number of items

متغير تابع (dependent variable)

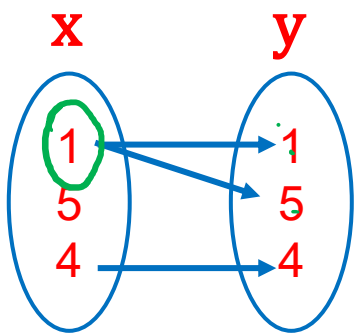
متغير مستقل (independent variable)

و لكن هل كل علاقة هى دالة ؟

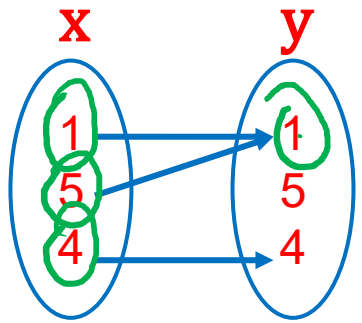
لا , شرط الدالة : أن كل قيمة فى x يقابلها قيمة واحدة فى y



function



Not function

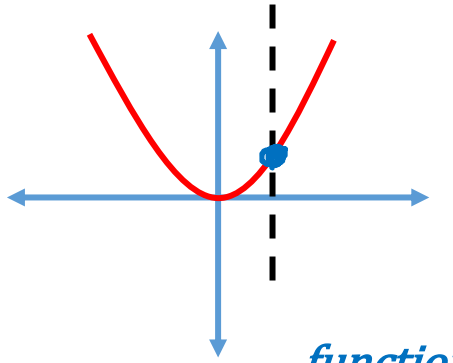


function

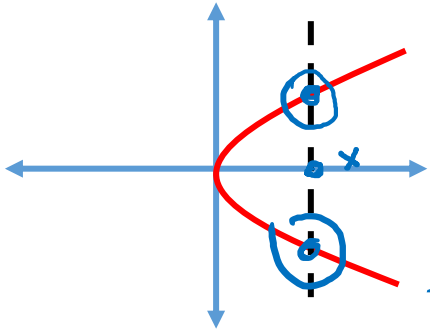
$f(x) = \{(2,3), (5,6), (-2,1), (2,4)\}$

Functions

Vertical line test:

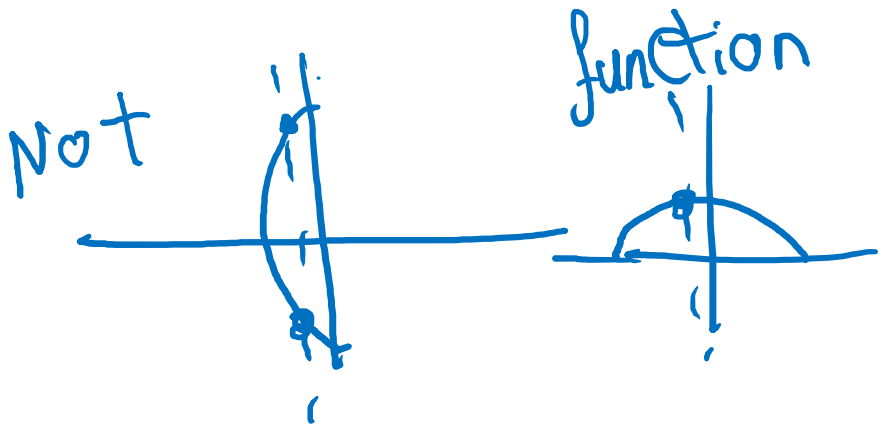


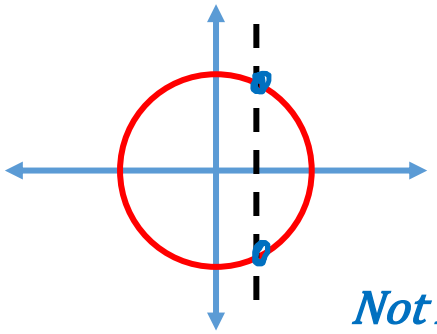
function



Not function

Question: The circle is a function or not ? :



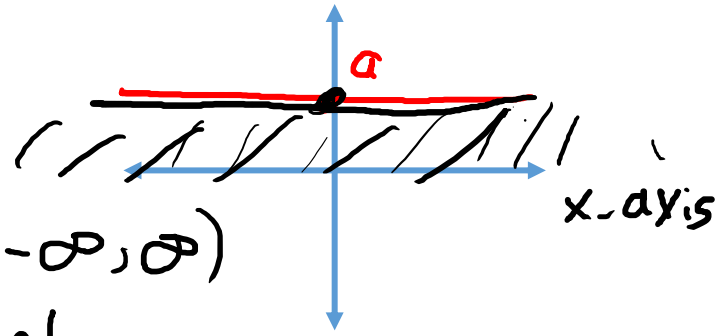


Not function

Graphs of functions

y = 3

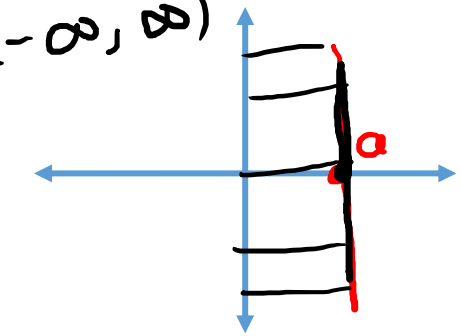
1) $y = a$



Domain: $(-\infty, \infty)$

Range : $\{a\}$

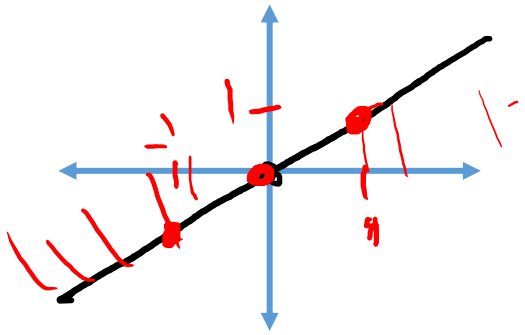
$x = a$



Domain: $\{a\}$

Range : $(-\infty, \infty) = \mathbb{R}$

2) $y = x$

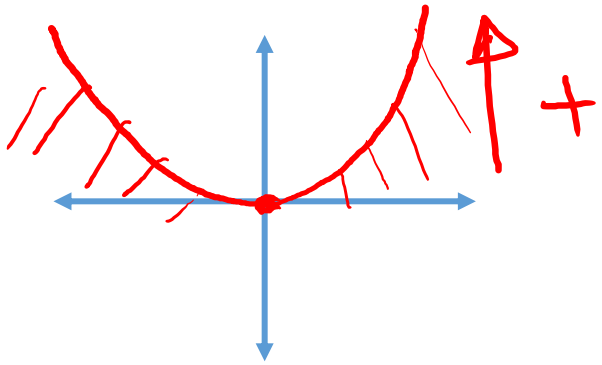


Domain: $(-\infty, \infty)$

Range : $(-\infty, \infty)$

Graphs of functions

3) $y = x^2$



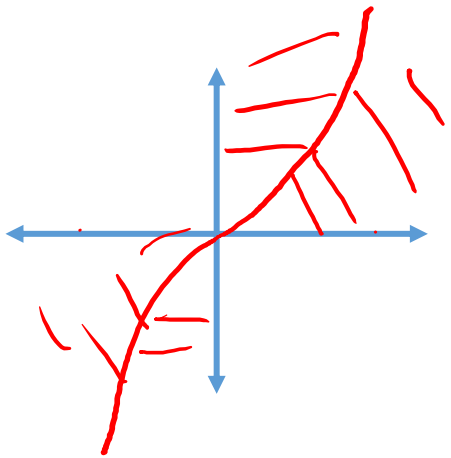
Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

$y = 2^2 = 4$

$y = (-3)^2 = 9$

4) $y = x^3$



Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

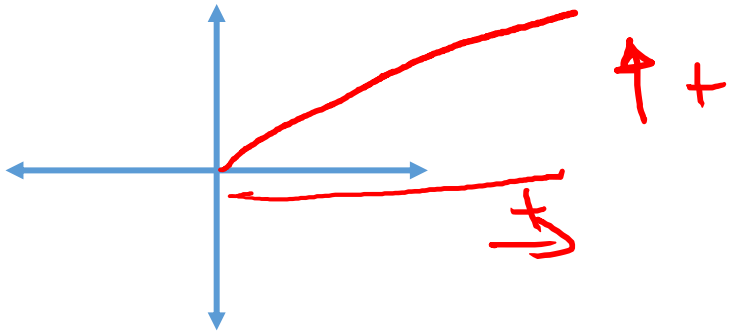
$y = (-2)^3 = -8$

$\sqrt{-9}$ لا لا

Graphs of functions

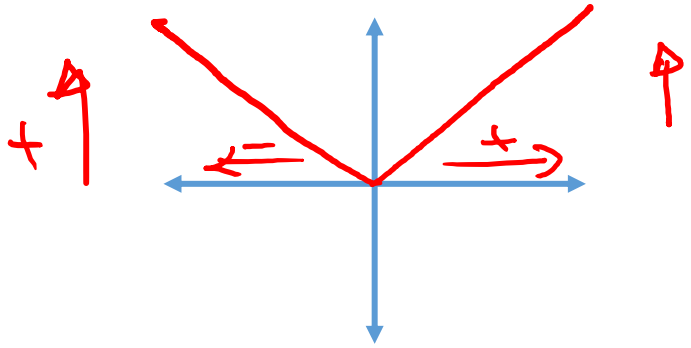
5) $y = \sqrt{x}$ موجب

$y = -\sqrt{9} = 3$



$|-b| = b$

6) $y = |x|$

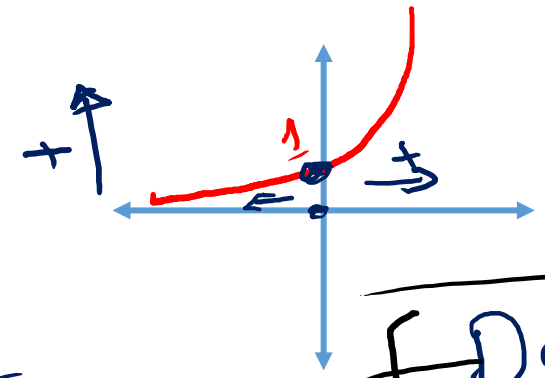


Graphs of functions

$e = 2.7(7)71\ldots$

$e = 2.71$

7) $y = e^x$



at $x = 0$

$y = e^0 = 1$

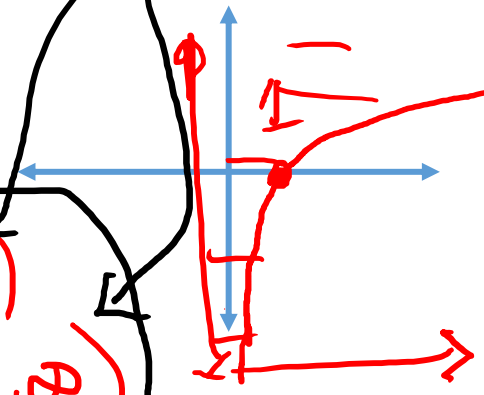
Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

$(0,1)$

$0, 2$

8) $y = \ln|x|$



Domain: $(0, \infty)$

Range: $(-\infty, \infty)$

$y = 2^x$

$2^2 = 4$,

$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$

$[\ ,\ ]$ closed

$]\ ,\ [$ open

$(\ ,\ )$ open

$(1, \infty)$

$[0, \infty)$

0 is included

$(0, \infty)$ 0 is not incl

logarithm

$\log_3 x = 2 \Rightarrow x = 3^2$

$\log_5 x = 4 \Rightarrow x = 5^4$

$\log x = b \Rightarrow x = 10^b$

$\log = \log_{10}$

$\log_e x = 5 \Rightarrow x = e^5$

$\ln x = 5$

$x = e^5$

$\Rightarrow \ln = \log_e$

natural logarithm

Thank you