Jeopardy Game

	A	B	C	D	E	F
1						
2						
3						
4						

Solution

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$$\ln \frac{x}{y} =$$

- a $\ln x + \ln y$
- b $\ln x - \ln y$
- c $x \ln y$
- d $y \ln x$
- e none of them

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The function $y = x^2 \cdot \sin x$ is

a odd

b even

c neither odd nor even

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A

$\arctan 1 =$

- a ∞
- b $\frac{\pi}{3}$
- c $\frac{\pi}{4}$
- d $\frac{\pi}{6}$
- e none of them

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The equivalence "$a < b$ if and only if $f(a) < f(b)$" is the property of

- a even functions
- b one-to-one functions
- c continuous functions
- d increasing functions
- e none of them

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How many points of inflection is on the graph of the function $y = \sin x$ in the open interval $(0, 2\pi)$

- a none
- b one
- c two
- d three
- e none of them

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Find points of discontinuity of the function $y = \dfrac{x-4}{(x-2)\ln x}$

a	none
b	0
c	$0,\ 1$
d	$0,\ 1,\ 2$
e	$0,\ 2$
f	$0,\ 1,\ 4$
g	$0,\ 4$
h	none of them

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B

Let f be a function and f^{-1} be its inverse. Then $f^{-1}\big(f(x)\big) =$

a	0
b	1
c	x
d	$f(x)$
e	$f^{-1}(x)$
f	none of them

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$\arcsin(\sin x) = x$ for every $x \in \mathbf{R}$

a Yes

b No

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$$\lim_{x\to-\infty} \operatorname{arctg} x =$$

- a 0
- b $\frac{\pi}{2}$
- c $-\frac{\pi}{2}$
- d ∞
- e $-\infty$
- f none of them

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$$\lim_{x\to\infty} \sin x =$$

- a 1
- b -1
- c does not exist
- d none of them

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$$\lim_{x\to\infty} \frac{2x^3 + x^2 + 4}{x^2 - x + 2} =$$

- a ∞
- b 2
- c 0
- d none of them

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$$\lim_{x\to 0^+} \frac{e^{1/x}(x-1)}{x}$$

- a 0
- b 1
- c e
- d ∞
- e -1
- f $-e$
- g $-\infty$
- h none of them

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D

$$\left(\frac{1}{\sqrt[3]{x}}\right)' =$$

a $\frac{1}{3}x^{-2/3}$

b $-\frac{1}{3}x^{-2/3}$

c $-\frac{1}{3}x^{1/3}$

d $\frac{1}{3}x^{-4/3}$

e $-\frac{1}{3}x^{-4/3}$

f none of them

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D

$$(x - x\ln x)' =$$

a $\ln x$

b $-\ln x$

c $1 + \ln x$

d $1 - \ln x$

e 0

f $1 - \frac{1}{x}$

g none of them

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D

$$\left(x^2 e^{x^2}\right)'$$

a	$2xe^{2x}$
b	$2xe^{x^2}2x$
c	$2xe^{x^2} + x^2e^{x^2}$
d	$2xe^{x^2} + x^2e^{x^2}2x$
e	$2xe^{x^2}2x + x^2e^{x^2}2x$
f	none of them

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The definition of the derivative of the function f at the point a is

a $\lim_{h\to 0} \frac{f(x+h)+f(x)}{h}$

b $\lim_{h\to 0} \frac{f(x+h)}{h}$

c $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

d $\lim_{h\to 0} \frac{f(x)-f(x+h)}{h}$

e $\lim_{h\to 0} \frac{f(x-h)-f(x)}{h}$

f none of them

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E

$(x^2+1)' =$

E

$(xe^x)' =$

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E

$$\ln(\sin x) =$$

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E

$$(xe^{-x})' =$$

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By theorem of Bolzano, the polynomial $y = x^3 + 2x + 4$ has zero on

- a $(0, 1)$
- b $(1, 2)$
- c $(2, 3)$
- d $(-1, 0)$
- e $(-2, -1)$
- f $(-3, -2)$
- g none of them

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F

Let $a \in Im(f)$. Then the solution of the equation $f(x) = a$ exists. This solution is unique if and only if

a f is one-to-one
b f is increasing
c f continuous
d f differentiable
e none of them

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If the function has a derivative at the point $x = a$, then it is

- a increasing at a.
- b decreasing at a.
- c one-to-one at a.
- d continuous at a.
- e undefined at a.

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If both $y(a) = y'(a) = y''(a) = 0$, then the function

a has local maximum at a.

b has local minimum at a.

c has point of inflection at a.

d any of these possibilites may be true, we need more informations.

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