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السؤال	الأول	الثاني	الثالث	الرابع	الخامس	السادس	السابع	المجموع
الدرجة								

السؤال الأول: ضعي رمز الإجابة الصحيحة للأسئلة من (1-20) في الجدول التالي:

السؤال	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
الجواب																					

If  $f(x) = \frac{\cos^{-1}x}{\sqrt{1-2x}}$ , then  $D(f)$  is: (1)

- (أ)  $(-\infty, -1/2)$  (ب)  $[-1, 1/2)$  (ج)  $[-1, 1]$  (د) none

If  $f$  is an odd function and  $g$  is an even function, then  $g \circ f$  is: (2)

- (أ) even (ب) odd (ج) neither even nor odd (د) none

The solution set of  $0 < |3x - 2| < 3$  is (3)

- (أ)  $(-1/3, 5/3)/\{2/3\}$  (ب)  $\mathbb{R}/\{2/3\}$  (ج)  $(-1/3, 5/3)$  (د) none

The values of  $x$  which satisfies the equation  $\sqrt{(x-1)^2} = 1-x$  are: (4)

- (أ)  $\mathbb{R}$  (ب)  $(-\infty, 1)$  (ج)  $(-\infty, 1]$  (د) none

If  $f(x) = x^2$  and  $g(x) = \sqrt{1-x}$ , then  $(f \circ g)(x)$  equals: (5)

- (أ)  $1-|x|$  (ب)  $1-x$  (ج)  $|1-x|$  (د) none

$D(f \circ g)$  equals: (5) في السؤال (6)

- (أ)  $x \leq 1$  (ب)  $x \geq 1$  (ج)  $|x| \leq 1$  (د) none

$\sin^{-1}(\sin(-\pi/3))$  equals: (7)

- (أ)  $\pi/3$  (ب)  $-\pi/3$  (ج)  $1/2$  (د) none

$$\lim_{x \rightarrow 0} \frac{2 \sin x - \sin 2x}{x^2} = \text{---} \quad (8)$$

none (د)      not exist (ج)      equals 1 (ب)      equals 0 (أ)

$$\lim_{x \rightarrow \pi^+} \frac{\cos x}{x - \pi} \quad (9)$$

none (د)      equals 1 (ج)      tends to  $-\infty$  (ب)      tends to  $\infty$  (أ)

(10)

If  $f(x) = \begin{cases} c^2 x & x < 1 \\ 3cx & x \geq 1 \end{cases}$ , then the values of  $c$  which makes  $f$  continuous on  $\mathbb{R}$  :

none (د)      any real number (ج)       $\{0, 3\}$  (ب)       $\{1, 3\}$  (أ)

$$f(x) = \begin{cases} 2, & x \geq 0 \\ -2x, & x < 0 \end{cases} \quad (13) \text{ و } (12) \text{ و } (11) \text{ في الأسئلة}$$

$$\lim_{x \rightarrow 0} f(x) \quad (11)$$

none (د)      equals  $-2$  (ج)      equals 2 (ب)      not exist (أ)

The function  $f$  is continuous on: (12)

none (د)       $[-1, 1]$  (ج)       $[-1, 0]$  (ب)       $(0, 1]$  (أ)

$f$  الدالة (13)

none (د)      one to one on  $(-\infty, 0)$  (ج)      one to one on  $[0, \infty)$  (ب)      one to one on  $D(f)$  (أ)

The function  $f(x) = x^2 \sqrt{x-3}$  is continuous on: (14)

none (د)       $[3, 6]$  (ج)       $[-3, 3]$  (ب)       $[0, 3]$  (أ)

If  $f(x) = \sec 3x$ , then  $f''(0)$  equals: (15)

none (د)      9 (ج)      0 (ب)       $-9$  (أ)

$$\lim_{x \rightarrow \infty} \frac{\sqrt{4x^2 + 5}}{1 - 2x} \quad (16)$$

none (د)      not exist (ج)      equals 1 (ب)      equals  $-1$  (أ)

If  $f(x) = \cos^{-1}(\tan x^2)$ , then  $f'(x)$  equals: (17)

none (د)       $\frac{2x \sec^2 x^2}{\sqrt{1-x^2}}$  (ج)       $\frac{\sec^2 2x}{\sqrt{1-\tan^2 x^2}}$  (ب)       $\frac{2x \sec^2 x^2}{\sqrt{1-\tan^2 x^2}}$  (أ)

If  $f(x) = \frac{x^2}{x^3 + 5}$ , then  $f'(x)$  equals: (18)

none (د)       $\frac{10x - x^4}{(x^3 + 5)^2}$  (ج)       $\frac{5x + x^4}{(x^3 + 5)^2}$  (ب)       $\frac{10x - x^3}{(x^3 + 5)^2}$  (أ)

The equation of the tangent of the curve of  $y = x^2(x - 1)^2$  at  $(2, 4)$  is: (19)

- none (د)       $12x - y = -2$  (ج)       $x + 12y = -46$  (ب)       $12x - y = 20$  (أ)

(20)

The function  $f(x) = x^2 - 3x + 2$  satisfies the conditions of Roll's theorem on the interval  $[1, b]$  when  $b$  equals:

- none (د)      2 (ج)      0 (ب)      -1 (أ)

If  $f(x) = 2x^3 - 15x^2 + 36x$ , then: السؤال الثاني

Decreasing intervals(if exist):	$f'(x) =$
Local maximum values(if exist):	Critical points are:
Local minimum values(if exist):	Increasing intervals(if exist):

If  $f(x) = x + \frac{1}{x}$ , then: السؤال الثالث:

Intervals of downward concavity (if exist):	$f'(x) =$
Intervals of upward concavity(if exist):	$f''(x) =$
Inflection points (if there exist):	

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## Solve In details

السؤال الرابع :

Find  $\frac{dy}{dx}$  if  $\cos(3y) + x^2 = xy^2 + 3$

السؤال الخامس :

Find the asymptotic lines (if possible) of the function  $f(x) = \frac{5(x-2)}{x^2-4}$

A rectangular farm with area of  $100 \text{ m}^2$  is being built.

Find the dimensions of the rectangle which make the circumference of the farm as small as possible (minimum).

If  $f(x) = \frac{1}{x^2(x+3)}$ , draw the curve of  $f(x)$  given that:

Asymptotic lines are:  $x = 0$ ,  $x = -3$ ,  $y = 0$

Increasing interval is:  $[-2, 0)$

decreasing intervals are:  $(-\infty, -3)$ ,  $(-3, -2]$ ,  $(0, \infty)$

Local minimum value:  $f(-2) = -1/4$

Local maximum value: not exist

Intervals of upward concavity are:  $(-3, 0)$ ,  $(0, \infty)$

Intervals of downward concavity are:  $(-\infty, -3)$

Inflection points: not exist