المراجعة النهائية

لليلة الاختبار

MATH 110

وتشمل حلول 6 إختبارات بلاك بورد

بالإضافة إلى الأفكار الاساسية بالمنهج

تمنياتي لكم بالتوفيق

السعدي

(١)

[الاختبار المساند الاول – (بلاك بورد) – رياضيات]

An equation of a line that passes through the point $(1,4)$ and is perpendicular to the line $8x+4y-12=0$ is	1
An equation of a line that passes through the point $(3,5)$ with slope $\frac{2}{3}$ is	2
If $\cos\theta = \frac{2}{5}$, and $0 < \theta < \frac{\pi}{2}$, then $\sin\theta = \frac{\sqrt{21}}{5}$	3
The solution of $x^2 - 9x + 14 \leq 0$ is	4
The degree measure of $\frac{10\pi}{9}$ is 220°	5

① Eq.

$$y = m(x - x_1) + y_1$$

$$y = \frac{1}{2}(x - 1) + 4$$

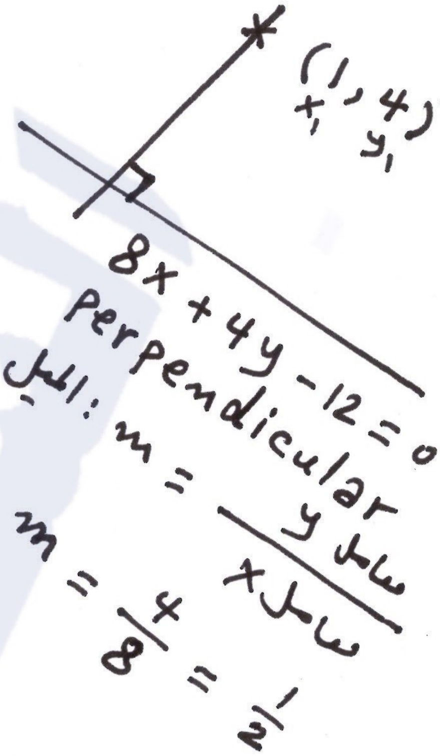
$$y = \frac{1}{2}x - \frac{1}{2} + 4$$

بالضرب في 2

$$2y = x - 1 + 8$$

$$2y = x + 7$$

$$2y - x - 7 = 0$$



* كذلك ممكن التعويض بالنقطة (1 , 4) في الاختيارات.

② point (3 , 5) — x_1 y_1 — slope: $m = \frac{2}{3}$

Eq. $$y = m(x - x_1) + y_1$$

$$y = \frac{2}{3}(x - 3) + 5$$

$$y = \frac{2}{3}x - 2 + 5$$

$$y = \frac{2}{3}x + 3$$

بالضرب في 3

$$3y = 2x + 9$$

$$3y - 2x - 9 = 0$$

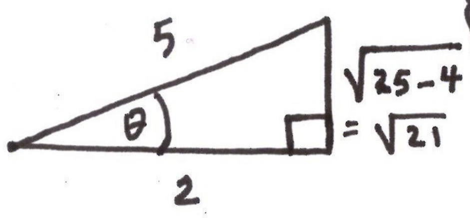
③ If: $\cos\theta = \frac{2}{5}$ and $0 < \theta < \frac{\pi}{2}$

2 → المجاور

5 → الوتر

then: $\sin\theta = \frac{\sqrt{21}}{5}$

$\boxed{\text{True}}$



$\sin\theta = \frac{\text{المقابل}}{\text{الوتر}} = \frac{\sqrt{21}}{5}$

④ The solution of:

$$x^2 - 9x + 14 \leq 0$$

الحل فتره واحده ومغلقة

$$[2 , 7]$$

⑤ The degree measure of $\frac{10\pi}{9}$ is $220°$ $\Rightarrow$ $\boxed{\text{False}}$

$$\frac{10\pi}{9} = \frac{10 \times \cancel{180}^{20}}{\cancel{9}_{1}} = 200°$$

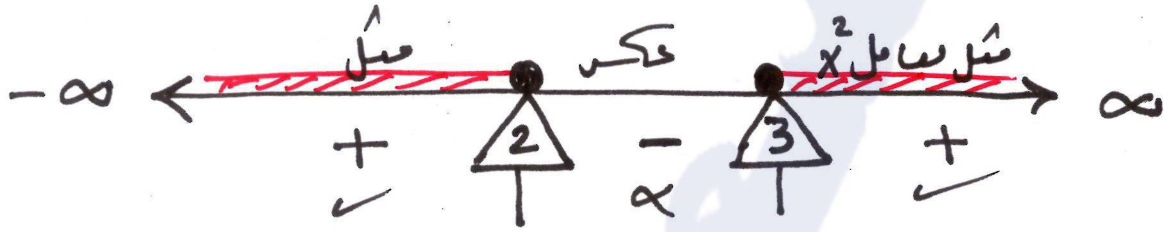
[الاختبار المساند الثاني – (بلاك بورد) – رياضيات]

The domain of the function $f(x) = \sqrt{x^2 - 5x + 6}$ is $\mathbb{R} - (2,3)$	1
The function $f(x) = \sqrt{x^2 + 3} + \frac{\sin x}{x^2+5}$ is algebraic function	2
The graph of f^{-1} is obtained by reflecting the graph of the function f about the line $y = x$.	3
To shift the graph of f(x) five units downward we write f(x) +5	4
f(x)= $\sqrt{x^8 + 1}$ Is even.	5

① $f(x) = \sqrt{x^2 - 5x + 6}$

$(x - 3)(x - 2)$

$x = 3 \mid x = 2$



Domain : $(-\infty, 2] \cup [3, \infty)$

or : $\mathbb{R} - (2,3)$

② $f(x) = \sqrt{x^2+3} + \dfrac{\sin x}{x^2+5}$

is algebraic function $\boxed{\text{false}}$

③ f^{-1} is obtained by reflecting the graph of the function f about the line $y = x$ $\boxed{\text{True}}$

A L S A A D I

(4) To shift the graph of $f(x)$

five units downward

we write $f(x) + 5 \rightarrow$ $\boxed{\text{false}}$

$f(x) - 5 \rightarrow$ True

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(5) $f(x) = \sqrt{x^8 + 1}$

$x^{8} + 1x^{0}$ is even $\boxed{\text{True}}$

[الاختبار المساند الثالث – (بلاك بورد) – رياضيات]

1 The function $f(x)=\begin{cases}\frac{x^2-25}{x-5}, & if\ x\neq 5\\ k, & if\ x=5\end{cases}$ is continuous on $\mathbb{R}$, if the value of the constant k is

2 $\lim\limits_{x\to a} f(x)=L$ **if and only if** $\lim\limits_{x\to a^-} f(x)=L=\lim\limits_{x\to a^+} f(x)$

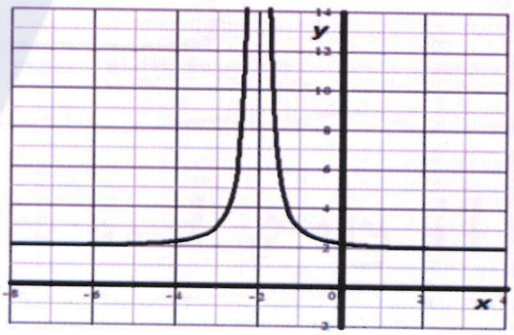
3 $\lim\limits_{x\to 0}\left(\frac{\sqrt{x^2}}{x}\right)=$

4 $\lim\limits_{x\to -\infty} \tan^{-1}x=$

5 $\lim\limits_{x\to 0}\frac{\sin 7x}{\sin 9x}=$

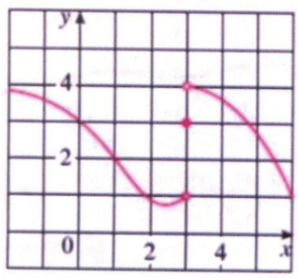
6 $\lim\limits_{x\to\infty}(7-2x-x^2)=$

7 The vertical asymptote of the graph of the function $f(x)$ is



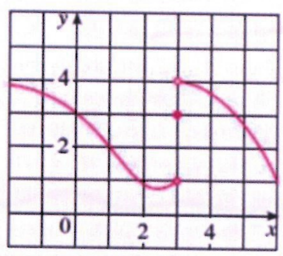
8 From the graph below

$\lim\limits_{x\to 3^+} f(x)=$



9 From the graph below

$\lim\limits_{x\to 3^-} f(x)=$



10 The horizontal asymptotes of the graph of the function $f(x)=\frac{\sqrt{4x^2+1}}{2x-5}$ are

① $f(x) = \begin{cases} \dfrac{x^2-25}{x-5}, & \text{if } x \neq 5 \\ k, & \text{if } x = 5 \end{cases}$

(النهاية من عند ≠) = (قيمة الدالة من عند =)

$\lim_{x \to 5} \dfrac{x^2-25}{x-5} = \dfrac{0}{0}$ لوبيتال

$\lim_{x \to 5} \dfrac{2x}{1} = 2(5) = 10$

$\Longrightarrow \boxed{K = 10}$

② $\lim_{x \to a} f(x) = L$ if and only if

$\lim_{x \to a^-} f(x) = L = \lim_{x \to a^+} f(x)$

$\boxed{\text{True}}$

④ $\lim_{x \to -\infty} \tan^{-1} x = \tan^{-1}(-\infty) = \boxed{-\frac{\pi}{2} = -90}$

A L S A A D I

③ $\lim_{x \to 0} \left(\frac{\sqrt{x^2}}{x} \right) = \lim_{x \to 0} \frac{|x|}{x}$ D.N.E.

Does Not Exist

لعدم تساوي

(النهاية اليمنى $+1$) ، (النهاية اليسرى -1)

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⑤ $\lim_{x \to 0} \frac{\sin 7x}{\sin 9x} = \boxed{\frac{7}{9}}$

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⑥ $\lim_{x \to \infty} (7 - 2x - x^2) = -\infty^2 = \boxed{-\infty}$

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⑦ Vertical asymptote بالرجوع للرسم

$\boxed{x = -2}$

⑧ $\lim_{x \to 3^+} f(x) = \boxed{4}$ بالرجوع للرسم :

⑨ $\lim_{x \to 3^-} f(x) = \boxed{1}$ بالرجوع للرسم :

⑩ $f(x) = \dfrac{\sqrt{4x^2+1}}{2x-5}$

The horizontal asymptotes:

$$y = \lim_{x \to +\infty} \frac{\sqrt{4x^2+1}}{2x-5} = \frac{2x}{2x} = \boxed{1}$$

$$y = \lim_{x \to -\infty} \frac{\sqrt{4x^2+1}}{2x-5} = \frac{-2x}{2x} = \boxed{-1}$$

$\therefore$ h. asymptotes are : $\boxed{y = \pm 1}$

[الاختبار المساند الرابع – (بلاك بورد) – رياضيات]

The function $y = \frac{x^2+1}{e^x-4}$ is continuous on $\mathbb{R} - \{\ln 4\}$			1
The vertical asymptote of the function $f(x) = \frac{x+1}{x-3}$ is			2
$\lim\limits_{x\to 0} x^2 \cos\frac{1}{x} =$	4	$\lim\limits_{x\to 0} \frac{x^2}{3-\sqrt{x^2+9}} =$	3
$\lim\limits_{x\to\infty} \frac{3x-2}{x^2-x+1} =$	6	$\lim\limits_{x\to\infty} \tan^{-1} x =$	5
$\lim\limits_{x\to 3^+} \frac{1}{x-3} =$	8	$\lim\limits_{x\to -2} \frac{x^2-4}{x-2} =$	7
$\lim\limits_{x\to 5} \frac{\frac{1}{x}-\frac{1}{5}}{x-5} =$	10	$\lim\limits_{x\to\infty} \frac{5x^2-x}{2x^2+3x+1} =$	9

① $y = \dfrac{x^2+1}{e^x-4}$

is continuous on $R - \{\ln 4\}$ اصفار المقا

$\boxed{\text{True}}$

② Vertical asymptote of : $f(x) = \dfrac{x+1}{x-3}$

is $\boxed{x = 3}$

③ $\lim\limits_{x \to 0} \dfrac{x^2}{3-\sqrt{x^2+9}} = \dfrac{0}{0}$ لوبيتال

$= \lim\limits_{x \to 0} \dfrac{2x}{-\dfrac{2x}{2\sqrt{x^2+9}}}$

$= \lim\limits_{x \to 0} \cancel{2x} \cdot -\dfrac{2\sqrt{x^2+9}}{\cancel{2x}} = -2\sqrt{9}$

$= \boxed{-6}$

④ $\lim_{x \to 0} x^2 \cos \frac{1}{x} = \boxed{0}$

الأولى نهايتها صفر

الثانية محدوده

⑤ $\lim_{x \to \infty} \tan^{-1} x = \tan^{-1}(\infty) = \boxed{\frac{\pi}{2} = 90}$

⑥ $\lim_{x \to \infty} \frac{3x-2}{x^2-x+1} = \boxed{0}$

درجه البسط أصغر من درجه المقام

⑦ $\lim_{x \to -2} \frac{x^2-4}{x-2} = \frac{4-4}{-2-2} = \frac{0}{-4} = \boxed{0}$

⑧ $\lim_{x \to 3^+} \frac{1}{x-3} = \frac{1}{+0} = \boxed{\infty}$

(9) $$\lim_{x \to \infty} \frac{5x^2 - x}{2x^2 + 3x + 1} = \boxed{\frac{5}{2}}$$

درجه البسط = درجه المقام

(10) $$\lim_{x \to 5} \frac{\frac{1}{x} - \frac{1}{5}}{x - 5} = \frac{0}{0}$$

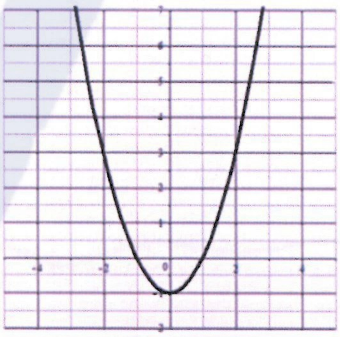
لوبيتال

$$\lim_{x \to 5} \frac{-\frac{1}{x^2}}{1}$$

$$= \boxed{-\frac{1}{25}}$$

ALSAADI

[الاختبار المساند الخامس – (بلاك بورد) – رياضيات]

The function $f(x) = 7x + 2$ is one–to-one.	1
The solution of $\lvert 3x - 1\rvert < -1$ is	2
The function $f(x) = \ln(e^x - 9)$ is continuous on $[\ln 9, \infty)$	3
$e^{\ln x} = x, \ x \in \mathbb{R}$	4
$\lim_{x \to -3^-} \frac{1}{x+3} =$	5
Let $f(x) = 12$ *and* $g(x) = -12$. Then $(f \circ g)(x) =$	6
The domain of $f(x) = \sqrt{6 - \sqrt{6 - x}}$ is	7
The equation of a line passing through the point $(0, 5)$ and parallel to the line $2x + 3y + 4 = 0$	8
The function $f(x) = x^{\frac{1}{3}}$ is power function	9
Using the graph of the $f(x)$ below, then the function f is even 	10

① $f(x) = 7x + 2$

is one-to-one $\rightarrow$ $\boxed{\text{True}}$

② solution of $|3x - 1| < -1$

is ϕ

③ $f(x) = \ln(e^x - 9)$

is continuous

on $[\ln 9, \infty)$

$\boxed{\text{False}}$

$e^x - 9 > 0$

$e^x > 9$

$\cancel{\ln} e^x > \ln 9$

$x > \ln 9$

$\ln 9 \quad \infty$

$(\ln 9, \infty)$

④ $e^{\ln x} = x \; ; \; x \in R$ $\boxed{\text{False}}$

$\boxed{x \in (0, \infty) \rightarrow \text{True}}$

⑤ $\lim\limits_{x \to -3^-} \dfrac{1}{x+3} = \dfrac{1}{-0} = \boxed{-\infty}$

⑥ Let $f(x) = 12$ and $g(x) = -12$

Then $(f \circ g)(x) = \boxed{12}$

⑦ $f(x) = \sqrt{6 - \sqrt{6 - x}}$

ما تحت الجذر الأكبر ≥ 0

$6 - \sqrt{6-x} \geq 0$

$-\sqrt{6-x} \geq -6$

$\sqrt{6-x} \leq 6$

$6 - x \leq 36$

$-x \leq 30$

$\boxed{x \geq -30}$

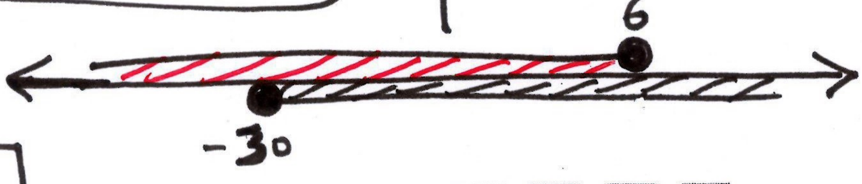
ما تحت الجذر الأصغر ≥ 0

$6 - x \geq 0$

$-x \geq -6$

$\boxed{x \leq 6}$

Domain

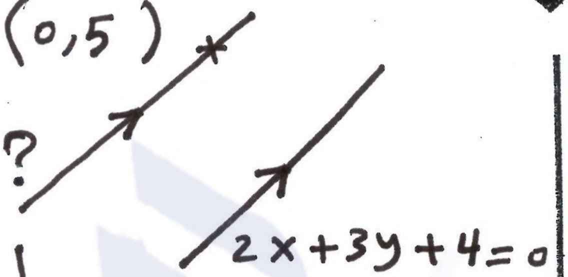


$= [-30, 6]$

8

$(0,\ 5)$
$\ x_1\ \ y_1$

$m = \frac{-2}{3}$



$m = \frac{-\text{معامل } x}{\text{معامل } y}$

$m = -\frac{2}{3}$

parallel

∴ لهما نفس الميل

Eq. $y = m(x - x_1) + y_1$

$y = -\frac{2}{3}(x - 0) + 5$

$\boxed{y = -\frac{2}{3}x + 5}$

بالضرب في 3

$3y = -2x + 15$

$\boxed{3y + 2x - 15 = 0}$

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9 $f(x) = x^{\frac{1}{3}}$ is power function

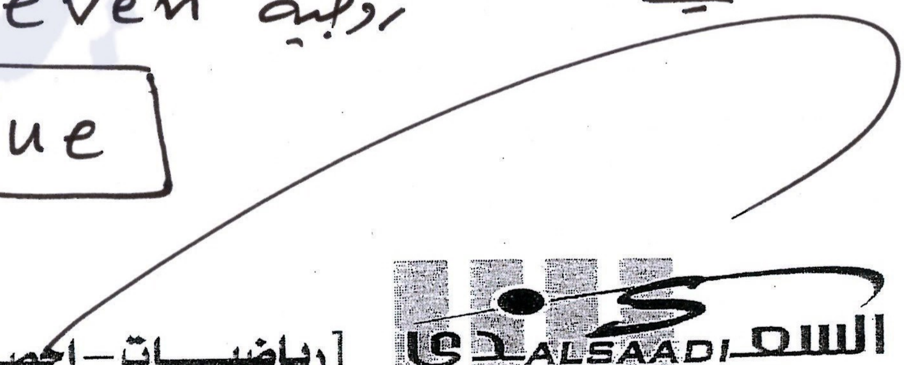
$\boxed{\text{True}}$

10

بالرجوع للرسم :

f is even زوجية

$\boxed{\text{True}}$



(19)

[الاختبار المساند السادس – (بلاك بورد) – رياضيات]

If $y^2 + x^2 = 5$, then $y' =$	1
If $y = 9^{\sin^{-1} x}$, then $y' = \frac{9^{\sin^{-1} x} \ln 9}{\sqrt{1-x^2}}$	2
If $y = -\cos(x)$, then $y^{(30)} =$	3
If $f(2) = 3, f'(2) = 5, g(2) = 1, g'(2) = 4$, then $\left(\frac{f}{g}\right)'(2) =$	4
If $y = \log_8(9 - 2x^3)$, then $y' = \frac{6x^2}{(2x^3-9)\ln 8}$	5
If $y = xe^x$, then $y^{(12)} =$	6
If $y = \csc(e^x)$, then $y' = -\csc(e^x)\cot(e^x)$	7
If $y = x^{\tan x}$ then $y' = x^{\tan x}\left(\frac{\tan x}{x} + (\sec^2 x)(\ln x)\right)$	8
If $\cos(x + y) = y^2 \sin x$, then $y' = -\frac{\sin(x+y) + y^2 \cos x}{\sin(x+y) + 2y \sin x}$	9
If $y = \sin^{-1}(3x + 2)$, then $y' = -\frac{3}{\sqrt{1-(3x+2)^2}}$	10

① If: $y^2 + x^2 = 5$ find $\underline{y'}$?

$2yy' + 2x = 0$

$2yy' = -2x$

$y' = \dfrac{-2x}{2y} \Rightarrow \boxed{y' = -\dfrac{x}{y}}$

② If: $y = 9^{\sin^{-1}x}$ find $\underline{y'}$?

$y' = 9^{\sin^{-1}x} \cdot \dfrac{1}{\sqrt{1-x^2}} \cdot \ln 9$

$\boxed{y' = \dfrac{9^{\sin^{-1}x} \ln 9}{\sqrt{1-x^2}}} \rightarrow \boxed{\text{True}}$

③ If: $y = -\cos x$ find $\underline{y^{(30)}}$?

$y' = -(-\sin x) = \sin x$

هي نفسها y''

$y^{(30)} = y'' = \cos x$

④ If :

$f(2) = 3 \quad , \quad f'(2) = 5$

$g(2) = 1 \quad , \quad g'(2) = 4$

معطيات

Then $\left(\frac{f}{g}\right)'(2) = \dfrac{f' \cdot g - g' \cdot f}{(g)^2}$

$= \dfrac{(5)\cdot(1) - (4)\cdot(3)}{(1)^2}$

$= \dfrac{5 - 12}{1} = \boxed{-7}$

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⑤ If : $y = \log_8 (9 - 2x^3)$

Then : $y' = \dfrac{-6x^2}{(9 - 2x^3)\ln 8}$

بالضرب بسطاً ومقاماً في سالب

$$\boxed{y' = \dfrac{6x^2}{(2x^3 - 9)\cdot \ln 8}} \rightarrow \boxed{\text{True}}$$

(6) If : $y = x e^x$ Then $y^{(12)} = ?$

$y' = 1 \cdot e^x + e^x \cdot x = (1+x)e^x$

$y'' = 1 \cdot e^x + e^x \cdot (1+x)$

$= 1 \cdot e^x + e^x \cdot 1 + e^x \cdot x = (2+x)e^x$

بالقياس

$y^{(12)} = \text{-------------} = \boxed{(12+x)e^x}$

(7) If: $y = \csc(e^x)$

$y' = e^x \cdot -\csc(e^x)\cot(e^x)$

$y' = \boxed{-e^x \csc(e^x) \cot(e^x)}$

⑧ If : $y = x^{\tan x}$ find $\underline{y'}$?

بأخذ ln للطرفين بحذف ...

$$\ln y = \ln x^{\tan x}$$

$$\ln y = \tan x \cdot \ln x \qquad \text{اشتق}$$

$$\frac{y'}{y} = \sec^2 x \cdot \ln x + \frac{1}{x} \cdot \tan x$$

$$y' = y\left[\frac{\tan x}{x} + \sec^2 x \,\ln x\right]$$

$$\boxed{y' = x^{\tan x}\left[\frac{\tan x}{x} + \sec^2 x \,\ln x\right]}$$

True

⑨ If: $\cos(x+y) = y^2 \sin x$ find y'?

اشتقه

$$-(1+y')\sin(x+y) = 2yy' \cdot \sin x + \cos x \cdot y^2$$

$$-\sin(x+y) - y'\sin(x+y) = 2yy'\sin x + y^2\cos x$$

$$-2yy'\sin x - y'\sin(x+y) = y^2\cos x + \sin(x+y)$$

$$y'\left(-2y\sin x - \sin(x+y)\right) = y^2\cos x + \sin(x+y)$$

$$y' = \frac{y^2\cos x + \sin(x+y)}{-2y\sin x - \sin(x+y)}$$

بالضرب
بسالب
ونتاقش −

$$\boxed{y' = -\frac{y^2\cos x + \sin(x+y)}{2y\sin x + \sin(x+y)}} \rightarrow \boxed{\text{True}}$$

حل آخر : ...

⑩ If: $y = \sin^{-1}(3x+2)$ find y'?

$$y' = \boxed{-\frac{3}{\sqrt{1-(3x+2)^2}}} \rightarrow \boxed{\text{false}}$$

الصح
بدون
سالب

بالإضافة إلي مجموعة الأسئلة التالية

(1)	The critical numbers of the function $f(x)=2x^3+3x^2-36x$ are:			
	(A) 0, 1,3	(B) -3 ,2	(C) 0,1	(D) 0, 1,-2

(2)	The function $f(x)=2x^3+3x^2-36x$ has a local maximum value at			
	(A) $x=3$	(B) $x=-1$	(C) $x=-3$	(D) $x=-2$

(3)	The function $f(x)=2x^3+3x^2-36x$ has a local minimum value at			
	(A) $x=-1$	(B) $x=2$	(C) $x=3$	(D) $x=-2$

(4)	The function $f(x)=2x^3+3x^2-36x$ is increasing on:			
	(A) $(-\infty,-3)\cup(2,\infty)$	(B) $(-\infty,-3)$	(C) $(2,\infty)$	(D) $(-3,2)$

(5)	The function $f(x)=2x^3+3x^2-36x$ is decreasing on:			
	(A) $(-\infty,-3)\cup(2,\infty)$	(B) $(-\infty,-3)$	(C) $(2,\infty)$	(D) $(-3,2)$

(6)	The graph of the function $f(x)=2x^3+3x^2-36x$ is concave upward on:			
	(A) $(-\infty,-\frac{1}{2})$	(B) $(-\frac{1}{2},\infty)$	(C) $(1,\infty)$	(D) $(0,\infty)$

(7)	The graph of the function $f(x)=2x^3+3x^2-36x$ is concave downward on:			
	(A) $(-\infty,-\frac{1}{2})$	(B) $(-\frac{1}{2},\infty)$	(C) $(1,\infty)$	(D) $(0,\infty)$

(8)	The graph of the function $f(x)=2x^3+3x^2-36x$ has an inflection point on:			
	(A) $(-1,37)$	(B) $(\frac{1}{2},-17)$	(C) $(0,0)$	(D) $(-\frac{1}{2},\frac{37}{2})$

$$\boxed{f(x) = 2x^3 + 3x^2 - 36x}$$

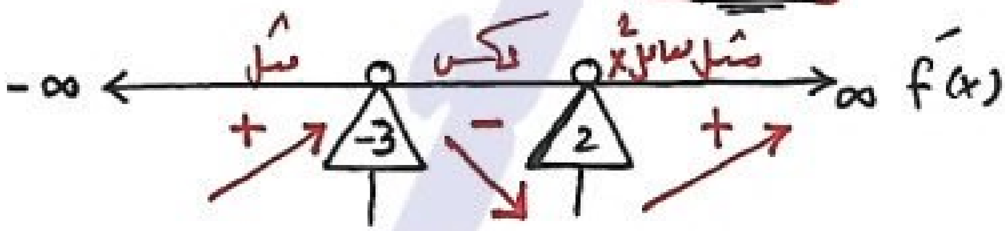
$$\boxed{f'(x) = 6x^2 + 6x - 36} = 0 \quad \div 6$$

$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

$$\boxed{x = -3} \;\Big|\; \boxed{x = 2}$$

① critical numbers are: $\boxed{-3, 2}$



② local maximum value at $\boxed{x = -3}$

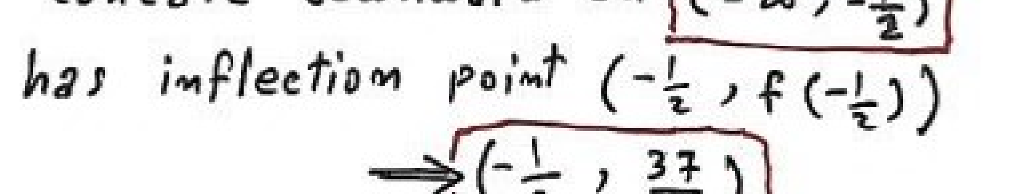
③ 〃 minimum value at $\boxed{x = 2}$

④ $f(x)$ increasing on $\boxed{(-\infty, -3) \cup (2, \infty)}$

⑤ $f(x)$ decreasing on $\boxed{(-3, 2)}$

$$\boxed{f''(x) = 12x + 6} = 0$$

$$12x = -6 \Rightarrow x = \frac{-6}{12} \Rightarrow x = -\frac{1}{2}$$



⑥ $f(x)$ concave upward on $\boxed{\left(-\frac{1}{2}, \infty\right)}$

⑦ $f(x)$ concave downward on $\boxed{\left(-\infty, -\frac{1}{2}\right)}$

8 $f(x)$ has inflection point $\left(-\frac{1}{2}, f\left(-\frac{1}{2}\right)\right)$

$$\Rightarrow \boxed{\left(-\frac{1}{2}, \frac{37}{2}\right)}$$

ALSAADI

(1)

The vertical asymptotes of the graph of the function $y=\dfrac{2x^2+x-1}{x^2+x-2}$ are			
(a) $x=2$	(b) $x=1, x=-2$	(c) $y=2$	(d) $y=1, y=-2$

(2)

The horizontal asymptote of the graph of the function $y=\dfrac{2x^2+x-1}{x^2+x-2}$ is			
(a) $x=2$	(b) $x=1, x=-2$	(c) $y=2$	(d) $y=1, y=-2$

* Vertical asymptote: $X =$ اصفار المقام

$$\boxed{X = 1 \; , \; X = -2}$$

اعكس الاشارتين و......

* Horizontal asymptote:

$$y = \lim_{x \to \pm\infty} \frac{2x^2 + x - 1}{x^2 + x - 2}$$

درجة البسط = درجة المقام

$$y = \frac{2}{1}$$

$$\Rightarrow \boxed{y = 2}$$

(3)

$\lim_{x\to\infty}\dfrac{1-x-2x^2}{x^2-7}=$	درجه البسط = درجه المقام		
(a) -4	(b) 4	(c) -2	(d) 2

$$\lim_{x\to\infty}\frac{1-x-2x^2}{x^2-7}=\frac{-2}{1}$$ المعاملات

$$=\boxed{-2}$$

(4)

If f has a local maximum or minimum at c, then c is a critical number of f.	
(A) True	(B) False

True

(5)

If the graph of $y=x^2$ is shifted up 2 units and left 3 units, the equation for the new graph is			
(A) $y=(x-3)^2-2$	(B) $y=(x+3)^2-2$	(C) $y=(x+3)^2+2$	(D) $y=(x-3)^2+2$

* New function:

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

(6)

If $\sin\theta=\frac{2}{5},\ 0\le\theta\le\frac{\pi}{2}$ then $\sec\theta=$			
(A) $\frac{\sqrt{21}}{5}$	(B) $\frac{5}{\sqrt{21}}$	(C) $\frac{\sqrt{21}}{2}$	(D) $\frac{5}{2}$

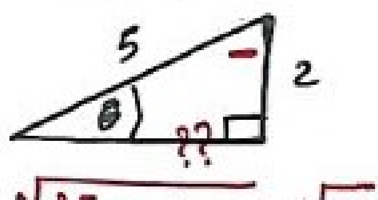
$\sin\theta=\dfrac{2 \rightarrow \text{المقابل}}{5 \rightarrow \text{الوتر}}$; $0\le\theta\le\frac{\pi}{2}$

الربع الأول

كل الدوال المثلثية موجبة

* $\sec\theta=\dfrac{\text{الوتر}}{\text{المجاور}}=\boxed{\dfrac{5}{\sqrt{21}}}$

مقلوب cos



$\sqrt{25-4}=\sqrt{21}$

7

If $f(x)=\tan^{-1}2x$ then $f''(x)=$			
(A) $\frac{2}{1+4x^2}$	(B) $-\frac{16}{(1+4x^2)^2}$	(C) $-\frac{16x}{(1+4x^2)^2}$	(D) $-\frac{2}{1+4x^2}$

$$f(x)=\tan^{-1}2x \Rightarrow f'(x)=\frac{2}{1+4x^2}$$

مشتقة الزاوية / 1 + مربع الزاوية

$$f''(x)=\frac{\text{البسط . مشتقة المقام} - \text{المقام . مشتقة البسط}}{\text{مربع المقام}}$$

$$=\frac{0\cdot(1+4x^2)-8x\cdot 2}{(1+4x^2)^2}=\boxed{\frac{-16x}{(1+4x^2)^2}}$$

8

An equation for tangent line to $f(x)=\frac{2}{x^2+1}$ at the point $(1,1)$ is:			
(A) $y=2x-1$	(B) $y=x$	(C) $y=-x+2$	(D) $y=-2x+3$

لا بد من الحل التقليدي .

النقطة تصلح مع كل الاختيارات

$$f'=\frac{0\cdot(x^2+1)-2x\cdot 2}{(x^2+1)^2}$$

$$(\underset{x_1}{1},\underset{y_1}{1})$$

$$f'=\frac{-4x}{(x^2+1)^2}$$

$$m=\frac{-4(1)}{(1+1)^2}=\frac{-4}{4}\Rightarrow \boxed{m=-1}$$

Equation of tangent line:

$$y=m(x-x_1)+y_1$$

$$y=-1(x-1)+1 \Rightarrow y=-x+1+1$$

$$\boxed{y=-x+2}$$

A L S A A D I

9

If $f(x)=(7)^{\sin 3x}$; then $f'(x)=$			
(A) $(7)^{\sin 3x}\ln 7$	(B) $-3(7)^{\sin 3x}\cos 3x\ln 7$	(C) $(7)^{\sin 3x}\cos 3x\ln 7$	✓ (D) $3(7)^{\sin 3x}\cos 3x\ln 7$

$$f(x) = 7^{\sin 3x}$$

$$f' = 7^{\sin 3x} \cdot 3\cos 3x \cdot \ln 7$$

$$= 3(7)^{\sin 3x} \cos 3x \ \ln 7$$

10

$\lim_{x\to 0}\frac{1-\cos x}{x^2}=$ $\frac{0}{0}$ لوبيتال			
✓ (A) $\frac{1}{2}$	(B) 4	(C) 2	(D) $\frac{1}{4}$

$$* \lim_{x\to 0} \frac{-(-\sin x)}{2x} = \lim_{x\to 0} \frac{\sin x}{2x} = \frac{0}{0}$$

لوبيتال مرة أخرى

$$* \lim_{x\to 0} \frac{\cos x}{2} = \boxed{\frac{1}{2}}$$

11

$\lim_{x\to 1}\sin^{-1}\left(\frac{x-1}{x^2-1}\right)=$ $\frac{0}{0}$ لوبيتال			
(a) $\frac{\pi}{2}$	✓ (b) $\frac{\pi}{6}$	(c) $\frac{\pi}{3}$	(d) Does not exist

$$\lim_{x\to 1} \sin^{-1}\left(\frac{1}{2x}\right)$$

$$\sin^{-1}\left(\frac{1}{2}\right) = 30 = \boxed{\frac{\pi}{6}}$$

$\sin \longrightarrow \frac{1}{2}$

A L S A A D I

(12)

The function $f(x)=\dfrac{\ln x}{x^2-4}$ is continuous on			
(a) $(0,2)\cup(2,\infty)$ ✓	(b) $R-\{-2,2\}$	(c) $(0,2]\cup[2,\infty)$	(d) $(0,\infty)$

0 2 ∞

f(x) continuous on

$(0,2)\cup(2,\infty)$

نوجد مجال البسط ونستبعد منه اصفار المقام

$x^2-4=0$

$x^2=4$

$x=\pm 2$

(13)

If $y=e^x \sec x$ then $y'=$			
(A) $e^x \sec x(\tan x+1)$ ✓	(B) $e^x(\tan x+1)$	(C) $e^x(\sec x+\tan x)$	(D) $e^x\sec^2 x+\tan x$

$y'=$ الأولى . مشتقة الثانية + الثانية . مشتقة الأولى

$y'=e^x \cdot \sec x + \sec x \tan x \cdot e^x$

$y'=e^x \sec x(\tan x+1)$

(14)

$\lim\limits_{x\to 0}\dfrac{\sqrt{x+9}-3}{x}=$ $\dfrac{0}{0}$ (I.f.) لوبيتال			
(a) $\frac{1}{6}$ ✓	(b) -6	(c) $-\frac{1}{6}$	(d) 6

$$\lim_{x\to 0}\frac{\frac{1}{2\sqrt{x+9}}}{1}=\frac{1}{2\sqrt{0+9}}$$

$$=\frac{1}{2\sqrt{9}}=\boxed{\frac{1}{6}}$$

(15)

If f(x) = sin(cos x) , then f′(x) =			
(A)cosx cos(cosx)	(B) −sinx cos(cosx) ✓	(C) sinx cos(cosx)	(D) cosx sin(cosx)

$f(x)=\sin(\cos x)$ اشتقه طبقاً لترتيب الأسهم

② ①

$f'(x)=-\sin x\cdot\cos(\cos x)$

16) The function $f(x)=\begin{cases}\dfrac{x^2-9}{x+3} & \text{if } x\neq -3\\ -6 & \text{if } x=-3\end{cases}$ is continuous at $x=-3$

(a) True	(b) False

النهاية $\lim\limits_{x\to -3}\dfrac{x^2-9}{x+3}=\dfrac{0}{0}$ لوبيتال

$\lim\limits_{x\to -3}\dfrac{2x}{1}=2(-3)=\boxed{-6}$

النهاية = قيمة الدالة

قيمة الدالة $f(-3)=\boxed{-6}$

$\therefore f(x)$ is $\boxed{\text{continuous at } x=-3}$

17) If $f(x)=\begin{cases}2x+3 & ;\ x\geq 0\\ 2x+5 & ;\ x<0\end{cases}$, then $\lim\limits_{x\to 0}f(x)=$

(a) 3	(b) 5	(c) 1	(d) Does not exist

$*\lim\limits_{x\to 0^+}(2x+3)=\boxed{3}$

$*\lim\limits_{x\to 0^-}(2x+5)=\boxed{5}$

$\lim\limits_{x\to 0}f(x)$ Does not exist

18) The function $f(x)=\dfrac{x-5}{x^2-3x+2}$ is discontinuous at

(A) 0,-2	(B) -1,2	(C) 1,2	(D) -1,-2

$f(x)$ is discontinuous at $x=$ اصفار المقام

$x=1,2$ اعكس الاشارة تيمو ---

19) $\log_2 16-\log_2 8+\log_2 4=$

(a) 2	(b) 3	(c) 1	(d) 4

$=\log_2\left(\dfrac{\cancel{16}^{\,2}\times 4}{\cancel{8}_{\,1}}\right)=\log_2 8=\log_2 2^3$

$=\boxed{3}$

20

Any rational function is continuous on $\mathbb{R}=(-\infty,\infty)$.	
(a) True	(b) False ✓

الداله الكسريه (النسبيه) (rational

متصله على $\mathbb{R} \setminus \{$ أصفار المقام $\}$

21

If f is a differentiable function at a, then f is a continuous function at a.	
(a) True ✓	(b) False

سؤال نظري

22

$\cot\theta.\sec\theta=$			
(a) $\cos\theta$	(b) $\tan\theta$	(c) $\sec\theta$	(d) $\csc\theta$ ✓

$\cot\theta \cdot \sec\theta$

$= \dfrac{\cancel{\cos\theta}}{\sin\theta} \cdot \dfrac{1}{\cancel{\cos\theta}} = \dfrac{1}{\sin\theta} = \boxed{\csc\theta}$

23

$\lim\limits_{x\to\infty}\dfrac{\sqrt{4x^2+1}}{x-1}=$			
(a) 5	(b) 4	(c) 2 ✓	(d) 1

$= \lim\limits_{x\to\infty} \dfrac{2x}{x} = \dfrac{2}{1} = \boxed{2}$

24

If $f(x)=\sin(\cos x)$, then $f'(x)=$			
(a) $\cos x\cos(\cos x)$	(b) $-\cos x\sin(\cos x)$	(c) $\sin x\cos(\cos x)$	(d) $-\sin x\cos(\cos x)$ ✓

$f = \sin(\cos x)$

$\xleftarrow{②} \quad \xleftarrow{①}$

$f' = -\sin x \ \cos(\cos x)$

اشتق طبقا لترتيب الأسهم

ALSAADI

25 If $y = \tan^{-1} x^2$, then $\frac{dy}{dx} =$

$y' = \frac{\text{مشتقة الزاوية}}{1 + \text{تربيع الزاوية}}$

(a) $\frac{1}{1+x^2}$	(b) $\frac{1}{1-x^2}$	(c) $\frac{2x}{1+x^2}$	(d) $\frac{2x}{1+x^4}$

$$y' = \frac{2x}{1+(x^2)^2} = \frac{2x}{1+x^4}$$

If $y = \cos^{-1}(x-2)$, then $y' =$

$\boxed{-\frac{\text{مشتقة الزاوية}}{\sqrt{1 - \text{تربيع الزاوية}}}}$

(A) $\frac{1}{\sqrt{1-(x-2)}}$ (B) $\frac{-1}{\sqrt{1-(x-2)^2}}$

(C) $\frac{-1}{\sqrt{1+(x+2)^2}}$ (D) $\frac{-1}{\sqrt{1-(x-2)^4}}$

$$y' = -\frac{1}{\sqrt{1-(x-2)^2}}$$

26 If $f(x)$ is a differentiable function, then $f'(x) =$

(a) $\lim\limits_{h\to 0}\frac{f(x+h)+f(x)}{h}$	(b) $\lim\limits_{h\to 0}\frac{f(x)-f(x+h)}{h}$
(c) $\lim\limits_{h\to \infty}\frac{f(x+h)-f(x)}{h}$	(d) $\lim\limits_{h\to 0}\frac{f(x+h)-f(x)}{h}$

قاعده تعريف المشتقه حفظ

27 If $y = e^2$ then $y' =$

(a) e	(b) $2e$	(c) 1	(d) 0

$y = e^2 \longrightarrow$ constant عدد ثابت

$y' = 0$

A L S A A D I

(28)

If $y=\dfrac{\sec x}{1+\sec x}$ then $\dfrac{dy}{dx}=$			
(a) $\dfrac{\sec x}{(1+\sec x)^2}$	(b) $\dfrac{\sec x\tan x}{1+\sec x}$	(c) $\dfrac{1}{(1+\sec x)^2}$	(d) $\dfrac{\sec x\tan x}{(1+\sec x)^2}$

$y' = \dfrac{\text{المقام . مشتقة البسط} - \text{البسط . مشتقة المقام}}{\text{مربع المقام}}$

$$y' = \frac{\sec x\tan x\cdot(1+\sec x) - \sec x\tan x\cdot\sec x}{(1+\sec x)^2}$$

$$= \frac{\sec x\tan x + \sec x\cancel{\tan x}\sec x - \sec x\cancel{\tan x}\sec x}{(1+\sec x)^2}$$

$$= \frac{\sec x\tan x}{(1+\sec x)^2}$$

(29)

The derivative $f'(x)$ for the function $f(x)=\tan x+\csc x$ is			
(a) $\sec^2 x+\csc x$	(b) $\sec x-\csc x\cot x$	(c) $\sec^2 x-\csc x\cot x$	(d) $\sec^2 x+\csc x\cot x$

$$f(x) = \tan x + \csc x$$

$$f'(x) = \sec^2 x - \csc x\cot x$$

(30)

If $y=e^x\tan x$, then $y'=$			
(a) $e^x(\sec^2 x+\tan x)$	(b) $e^x(\sec^2 x-\tan x)$	(c) $e^x(\sec x+\tan x)$	(d) $e^x\sec^2 x+\tan x$

$$y = e^x\tan x$$

$$y' = \underline{e^x}\cdot\tan x + \sec^2 x\cdot\underline{e^x}$$

$$= e^x(\sec^2 x + \tan x)$$

(31)

The function $f(x)=3x^3-x^5$ is			
(a) Even	(b) Odd	(c) Neither even nor odd	(d) Even and odd

جميع الأسس فردية.

ALSAADI

32 If $y=\frac{x}{e^x}$, the $y'=$

(a) $\frac{1+x}{e^x}$	(b) $\frac{1+x}{e^{2x}}$	(c) $\frac{1-x}{e^x}$	(d) $\frac{1-x}{e^{2x}}$

$$y'=\frac{1\cdot e^x-e^x\cdot x}{(e^x)^2}=\frac{\cancel{e^x}(1-x)}{(e^x)^{\cancel{2}}}$$

$$=\frac{1-x}{e^x}$$

33 If $f(x)=(x-1)e^x$, then $f'(x)=$

(a) $x e^x$	(b) $e^x(x-1)$	(c) $e^x(x+1)$	(d) e^x

$$f'(x)=1\cdot e^x+e^x\cdot(x-1)$$

$$=\cancel{e^x}+e^x x-\cancel{e^x}=e^x\cdot x$$

$$=\boxed{x e^x}$$

34 The graph of $y=\cos x$ is shifted up 6 units and right 2 units, the equation for the graph is

(a) $y=\cos(x-2)+6$	(b) $y=\cos(x+2)+6$	(c) $y=\cos(x-2)-6$	(d) $y=\cos(x+2)-6$

$$y=\cos(x-2)+6$$

If $y=\sin^2 5x$, then $y'=$

(A) $10\cos 5x$ (B) $10\sin 5x$ (C) $10\sin 5x\cos 5x$ (D) $5\cos 4x$

$y'=$ مشتقة الزاوية . تنزيل الأس . مشتقة الدالة بدون الأس

$$=5\cdot 2\sin^1 5x\cdot\cos 5x$$

$$=\boxed{10\sin 5x\cos 5x}$$

A L S A A D I

35

The equation of the line passing through (1,-6) and parallel to the line $x+2y=6$ is			
(a) $x+2y=-11$	(b) $x+2y=11$	(c) $x-3y=-11$	(d) $x+3y=11$

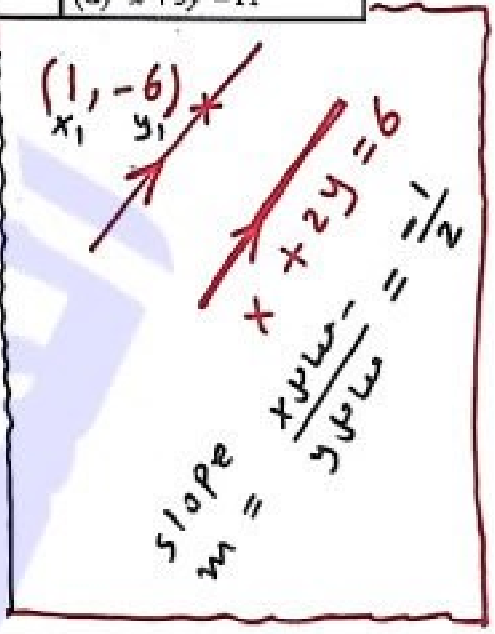
Eq. $y = m(x - x_1) + y_1$

$y = -\frac{1}{2}(x-1) + (-6)$

$y = -\frac{1}{2}x + \frac{1}{2} - 6$

$2y = -x + 1 - 12$

$\boxed{x + 2y = -11}$



36

The equation for the line passes through (−1,0) and perpendicular to the line $2x+3y-1=0$ is			
(a) $3y-2x=-3$	(b) $3y+2x=-3$	(c) $2y-3x=3$	(d) $2y+3x=3$

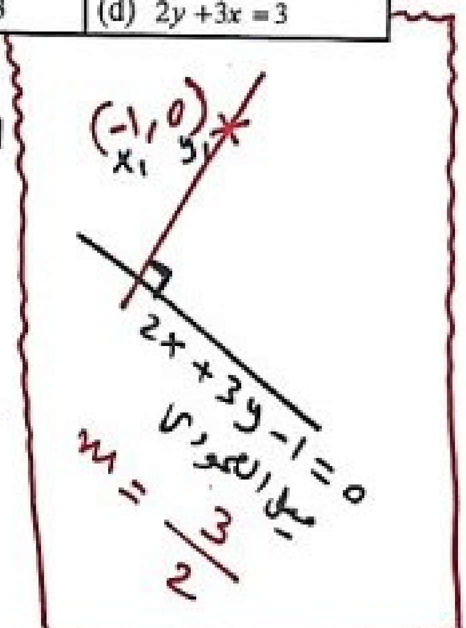
Eq. $y = m(x - x_1) + y_1$

$y = \frac{3}{2}(x - (-1)) + 0$

$y = \frac{3}{2}x + \frac{3}{2}$

$2y = 3x + 3$

$\boxed{2y - 3x = 3}$



37 . The derivative of $f(x) = \pi$ with respect to x is 1

A) True .

B) False.

$f(x) = \pi \longrightarrow$ ثابت

$f'(x) = 0$

A L S A A D I

38 If $y = x^{3x}$ then $y' =$

(A) $x^{3x}(3+3\ln x)$ (B) x^{-3x}

(C) $x^{-3x}\ln x$ (D) $3x^{-3x}\ln x$

$y = x^{3x}$

* بأخذ ln للطرفين بهدف انزال الأس

$\ln y = 3x \ln x$

* اشتق

$\frac{y'}{y} = 3 \cdot \ln x + \frac{1}{x} \cdot 3x$

$y' = y\,[3\ln x + 3]$

$y' = x^{3x}[3 + 3\ln x]$

39

If $y = x^x$ then $y' =$			
(A) $x^x \ln x$	(B) x^x	(C) $x^x(1-\ln x)$	(D) $x^x(1+\ln x)$

$y = x^x$

موجوده ب
تست بنك

40

The equation of the line passes through the point $(2,-3)$ with slope 6 is			
(a) $y-6x=-15$	(b) $y+6x=-15$	(c) $y+6x=15$	(d) $y-6x=15$

Eq. $\underset{x_1\ \ y_1}{(2,-3)}$ $m = 6$

$y = m(x - x_1) + y_1$

$y = 6(x-2) + (-3) \Rightarrow y = 6x - 12 - 3$

$\Rightarrow \boxed{y - 6x = -15}$

A L S A A D I

(41) If $\lim_{x \to 2} \dfrac{g(x)+3}{x} = -3$, then $\lim_{x \to 2} g(x) =$

(a) 0	(b) 3	(c) -3	(d) -9

$$\lim_{x \to 2} \frac{g(x)+3}{x} = -3$$

$$\frac{g(x)+3}{2} = -3 \Rightarrow g(x)+3 = -6$$

$$g(x) = -9 \longrightarrow \boxed{\lim_{x \to 2} g(x) = -9}$$

(42) If $y = \log_2(x^2-5)$, then $y' =$

(A) $\dfrac{2x}{(x^2+5)}$ (B) $\dfrac{x}{(x^2-5)\ln 2}$ (C) $\dfrac{1}{(x^2-5)}$ (D) $\dfrac{2x}{(x^2-5)\ln 2}$

$y = \log_2(x^2-5) \Rightarrow y' = \dfrac{\text{مشتقة الدالة}}{\text{الدالة} \cdot \ln 2}$

$$y' = \frac{2x}{(x^2-5) \cdot \ln 2}$$

(43) If $y = e^{\sec 3x}$, then $y' =$

(A) $e^{\sec 3x} \sec 3x$ (B) $3e^{\sec 3x} \sec 3x \tan 3x$

(C) $3e^{\sec 3x} \tan 3x$ (D) $3e^{\sec 3x} \tan^2 3x$

$$y = e^{\sec 3x}$$

$$y' = e^{\sec 3x} \cdot 3 \sec 3x \tan 3x$$

$$\boxed{y' = 3 e^{\sec 3x} \sec 3x \tan 3x}$$

ALSAADI

44

The inverse of the function of $f(x)=3+\frac{1}{2}x^2$ is			
(a) $f^{-1}(x)=\sqrt{2x-6}$	(b) $f^{-1}(x)=\sqrt{2x+6}$	(c) $f^{-1}(x)=\sqrt{6x-2}$	(d) $f^{-1}(x)=\sqrt{2x+3}$

$$f(x) = 3 + \frac{1}{2}x^2$$

العام ----
والخاص ----
والعكس ----

$$f^{-1} = \sqrt{2(x-3)}$$

$$= \sqrt{2x-6}$$

45

An equation of the tangent line to the curve $y=\sqrt[4]{x}$ at the point (1,1) is			
(a) $4y-x=3$	(b) $4y+x=3$	(c) $y-4x=5$	(d) $y+4x=5$

$y = \sqrt[4]{x}$ point $(\underset{x_1}{1}, \underset{y_1}{1})$

$$y' = \frac{1}{4\sqrt[4]{x^3}}$$

حل تقليدي لازم
التعويض في الاختيارات
يدعمك a , d صح

$$m = \frac{1}{4(1)} = \frac{1}{4}$$

Eq. $y = m(x - x_1) + y_1$

$$y = \frac{1}{4}(x-1)+1$$

$$y = \frac{1}{4}x - \frac{1}{4} + 1 \Rightarrow 4y = x - 1 + 4$$

$$\Rightarrow \boxed{4y - x = 3}$$

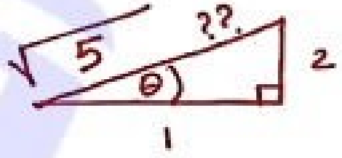
ALSAADI

46

If $\tan\theta = 2,\ 0 \le \theta \le \frac{\pi}{2}$ then $\cos\theta =$			
(a) $\frac{2}{\sqrt{5}}$	(b) $\frac{1}{\sqrt{5}}$	(c) $\frac{1}{3}$	(d) $\frac{2}{3}$

الربع الأول

$$\tan\theta = \frac{2 \rightarrow \text{المقابل}}{1 \rightarrow \text{المجاور}}$$



$$* \cos\theta = \frac{\text{المجاور}}{\text{الوتر}} = \frac{1}{\sqrt{5}}$$

47 If $x^3 + y^3 = 18xy$, then $y' =$

(A) $\frac{6y + x^2}{y^2 + 6x}$ (B) $\frac{6y + x^2}{y^2 - 6x}$ (C) $\frac{6y - x^2}{y^2 - 6x}$ (D) $\frac{x^2 - 6x}{6x - y^2}$

اشتقاق ضمني

اشتقاق

$$3x^2 + 3y^2 y' = 18y + y' \cdot 18x$$

$$3y^2 y' - 18x y' = 18y - 3x^2$$

$$y'(3y^2 - 18x) = 18y - 3x^2$$

$$y' = \frac{18y - 3x^2}{3y^2 - 18x} = \frac{\cancel{3}(6y - x^2)}{\cancel{3}(y^2 - 6x)}$$

$$\Rightarrow y' = \frac{6y - x^2}{y^2 - 6x}$$

وفي الختام ...

أرجو أن أكون قد وفقت في هذا العمل ....

وأن تعم به الفائدة لجميع الطلاب والطالبات

لا تنسونا من صالح دعائكم

السعدي