If $\lim\limits_{x \to 0} f(x) = 0$, then $\lim\limits_{x \to 0} \cos^{-1}(f(x)) =$

(A) $\frac{3\pi}{2}$

(B) π

(C) $\frac{-\pi}{2}$

(D) $\frac{\pi}{2}$

(E) 0

Q1) $\lim\limits_{x \to 0} \cos^{-1}(f(x)) = \cos^{-1}\left(\lim\limits_{x \to 0} f(x)\right)$

$= \cos^{-1}(0) = \dfrac{\pi}{2}$

$\ast$ D $\cos^{-1}(x) \rightsquigarrow [0, \pi]$

The integral that gives the area of the region that lies below the x-axis and above $f(x) = x^2 - 8x - 9$ is

(A) $\int_0^9 (9 + 8x - x^2)\, dx$

(B) $\int_{-1}^9 (x^2 - 8x - 9)\, dx$

(C) $\int_{-1}^9 (9 + 8x - x^2)\, dx$

(D) $\int_0^9 (x^2 - 8x - 9)\, dx$

(E) $\int_{-1}^9 x^2\, dx$

(A)

Q21) $x^2-8x-9=0$ (كشان أطلع حدود التقاطع)

$(x-9)(x+1)=0$

$x=-1,9$

$$= \int_{-1}^{9} \left(0-(x^2-8x-9)\right)dx$$

$$= \int_{-1}^{9} \left(9+8x-x^2\right)dx$$

$\boxed{C}$

$\sinh^{-1}(5) =$

(A) $5 + \sqrt{26}$

(B) $\ln(5 + \sqrt{24})$

(C) $\ln(5 + \sqrt{26})$

(D) $\frac{e^5 - e^{-5}}{2}$

(E) 5

Q3) $\sinh^{-1}(5)$

$$\sinh^{-1}(x) = \ln\left(x+\sqrt{x^2+1}\right)$$

$$= \ln\left(5+\sqrt{26}\right)$$

$\boxed{C}$

$$\lim_{t\to 0}\frac{e^{5t}-1}{\sin(3t)} =$$

(A) $\frac{1}{3}$

(B) 1

(C) 0

(D) 5

(E) $\frac{5}{3}$

Q41

$$\lim_{t\to 0} \frac{e^{5t}-1}{\sin(3t)} = \frac{0}{0} \quad \text{L.R}$$

$$\lim_{t\to 0} \frac{5e^{5t}}{3\cos(3t)} = \frac{5e^{0}}{3\cos 0} = \frac{5}{3} \quad \boxed{E}$$

The solution(s) of the equation

$(25)^x - 5^x = 6$ is (are)

(A) $x = \log_5(2)$

(B) $x = \log_5(3)$ and $x = \log_5(2)$

(C) $x = \log_5(3)$

(D) $x = \ln(2)$

(E) $x = \ln(3)$

Q5) $(25)^x - 5^x = 6$

$((5)^2)^x - 5^x - 6 = 0$

$(5^x)^2 - 5^x - 6 = 0$

let $u = 5^x$

$u^2 - \cancel{5}u - 6 = 0$

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

$u = 3$ $\quad\quad$ $u = -2$

$5^x = 3$ $\quad\quad$ $5^x = -1$

$\times$

$x = \log_5 3$

ans : $\boxed{x = \log_5 3}$ $\quad$ $\boxed{C}$

If $f(x) = 9^{x^5+x^3}$, then $f'(x) =$

(A) $9^{x^5+x^3}$

(B) $(5x^4 + 3x^2)\ 9^{x^5+x^3}$

(C) $\ln(9)\ 9^{x^5+x^3}$

(D) $\ln(9)(5x^4 + 3x^2)\ 9^{x^5+x^3}$

(E) $(x^5 + x^3)\ 9^{x^5+x^3-1}$

6)

$$f(x) = 9^{x^5+x^3}$$

$$y = 9^{(x^5+x^3)}$$

$$\ln y = (x^5+x^3)\ln 9$$

$$\frac{y'}{y} = (5x^4+3x^2)\ln 9$$

$$y' = \ln(4) \cdot 9^{(x^5+x^3)}(5x^4+3x^2) \longrightarrow \boxed{D}$$

If $g(x) = f(x^2 + 3x)$ and $f'(4) = 2$, then $g'(1) =$

(A) 2

(B) 10

(C) 5

(D) 11

(E) 22

71)

$$g'(x) = (2x+3)\,f'(x^2+3x)$$

$$g'(1) = (2+3)\,f'(1+3)$$

$$= 5\,f'(4)$$

$$= 5 \cdot 2 = 10 \rightsquigarrow \boxed{B}$$

$$\int_{1}^{\frac{1}{2}} \frac{e^{(1/x)}}{x^2}\,dx =$$

(A) $e - e^2$

(B) $-e^2$

(C) $e - \sqrt{e}$

(D) $\sqrt{e} - e$

(E) $1 - e^2$

81) $\displaystyle\int_1^{\frac{1}{2}} \frac{e^{\frac{1}{x}}}{x^2}\, dx$ let $u = \frac{1}{x}$ $\to$ $x = 1 \to u = 1$; $x = \frac{1}{2} \to u = 2$

$du = \frac{-dx}{x^2}$

$dx = -x^2 du$

$$\int_1^2 \frac{e^u}{\cancel{x^2}} \cdot -\cancel{x^2}\, du$$

$$-e^u \Big|_1^2 \to -(e^2 - e^1) = e - e^2 \rightsquigarrow \boxed{A}$$

If $f(x) = x^{\frac{1}{3}}(2x - 12)^{\frac{2}{3}}$ and $f'(x) = \frac{2x-4}{x^{\frac{2}{3}}\ (2x-12)^{\frac{1}{3}}}$

then f has a local minimum at

(A) $x = 0$

(B) $x = 6$ and $x = 0$

(C) $x = 6$

(D) $x = 2$

(E) $x = 2$ and $x = 6$

9) $f'(x) = 0 \rightsquigarrow \dfrac{\text{بسط} \rightsquigarrow = 0}{\text{مقام} \rightsquigarrow = 0}$

$\dfrac{2x-4}{x^{\frac{2}{3}}(2x-12)^{\frac{1}{3}}}$

$2x-4 \longrightarrow 2x-4=0 \rightarrow \boxed{x=2}$

$x^{\frac{2}{3}}(2x-12)^{\frac{1}{3}} \rightsquigarrow x^{\frac{2}{3}}=0 \rightarrow \boxed{x=0}$

$(2x-12)^{\frac{1}{3}}=0 \rightarrow 2x-12=0$

$\boxed{x=6}$

$C.N \rightarrow \{0,2,6\}$

$f(0) = 0$

$f(2) = 2^{\frac{1}{3}}(-8)^{\frac{2}{3}} \rightarrow 2^{\frac{1}{3}}(-8)^{\frac{2}{3}} = \left[(-8)^2\right]^{\frac{1}{3}} = 2^{\frac{1}{3}}\sqrt[3]{8^2} > 0$

$f(6) = 0$

So $f(x)$ has local min at

$x=0,\ x=6$ $\boxed{B}$

$\cos(\sin^{-1}(x)) =$

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

(B) $\sqrt{1+x^2}$

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

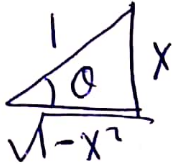
(D) $\frac{1}{\sqrt{1-x^2}}$

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

10) $\cos(\sin^{-1}(x))$

$\hookrightarrow \theta = \sin^{-1}(x)$

$\sin\theta = \frac{x}{1}$



$\cos\theta = \frac{\sqrt{1-x^2}}{1} \rightsquigarrow \boxed{A}$

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

(A) $\frac{2x}{\sqrt{x^4+1}}$

(B) $\frac{1}{\sqrt{x^4+1}}$

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

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

(E) $2x \ \cosh^{-1}(x^2)$

11) $f(x) = \sinh^{-1}(x^2)$

$$\frac{d}{dx}\left(\sinh^{-1}(x)\right) = \frac{1}{\sqrt{x^2+1}}$$

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

$$= \frac{2x}{\sqrt{x^4+1}} \Rightarrow \boxed{A}$$

$$\int \frac{\cosh^2(x) - \sinh^2(x)}{csch(x)}\, dx =$$

(A) $\ln(csch(x)) + c$

(B) $\sinh(x) + c$

(C) $\cosh(x) + c$

(D) $\frac{\cosh^3(x) - \sinh^3(x)}{3csch(x)} + c$

(E) $2\cosh(x) + c$

12) $$\int \frac{\cosh^2(x) - \sinh^2(x)}{\operatorname{csch}(x)}\, dx$$

$$\Rightarrow \int \frac{1}{\operatorname{csch}(x)}\, dx$$

$$\int \sinh(x)\, dx = \cosh x + c \qquad \boxed{C}$$

If $f(x) = \frac{x}{x^2-1}$, $f'(x) = \frac{-(x^2+1)}{(x^2-1)^2}$ and $f''(x) = \frac{2x(x^2+3)}{(x^2-1)^3}$,

then f has inflection point(s) at

(A) $x = 0$

(B) $x = 1$ and $x = -1$

(C) $x = 1$, $x = -1$ and $x = 0$

(D) $x = 1$ and $x = 0$

(E) $x = -1$ and $x = 0$

13) $f''(x) = \dfrac{\text{بسط}}{\text{مقام}}$ $\begin{matrix} \rightsquigarrow = 0 \\ \rightsquigarrow = 0 \end{matrix}$

$$= \frac{2x(x^3+3)}{(x^2-1)^3} \quad \begin{matrix} \rightsquigarrow x = 0,\ x = \sqrt[3]{-3} = -\sqrt[3]{3} \\ \rightsquigarrow x = 1,\ x = -1 \end{matrix}$$

* اذا واجهتك مشكلة بالإشارة ابقي على المسنجر

	$-\sqrt[3]{3}$		-1		0		1	
$+$		$+$		$+$		$-$		$+$

inflection point @ $x=1,\ x=0$

$\boxed{D}$

$$\lim_{x\to 1} (3-2x)^{\tan(\pi x/2)} =$$

(A) $e^{(1/\pi)}$

(B) $e^{(2/\pi)}$

(C) $e^{(4/\pi)}$

(D) ∞

(E) 1

14) $$\lim_{x\to 1} (3-2x)^{\tan\left(\frac{\pi x}{2}\right)} \rightsquigarrow 1^{\infty} \ ??$$

$$y = (3-2x)^{\tan\left(\frac{\pi x}{2}\right)}$$

$$\ln y = \tan\left(\frac{\pi x}{2}\right)\ln(3-2x)$$

$$\lim_{x\to 1} \ln y = \lim_{x\to 1} \tan\left(\frac{\pi x}{2}\right)\ln(3-2x) = \infty \cdot 0 \ ??$$

$$\lim_{x\to 1} \ln y = \frac{\ln(3-2x)}{1/\tan\left(\frac{\pi x}{2}\right)} = \frac{0}{0} \quad L.H$$

$$= \lim_{x\to 1} \frac{\frac{-2}{3-2x}}{\frac{-1\left(\frac{\pi}{2}\cdot \sec^2\left(\frac{\pi x}{2}\right)\right)}{\tan^2\left(\frac{\pi x}{2}\right)}}$$

$$\Rightarrow \lim_{x\to 1} \ln y = \lim_{x\to 1} \frac{2\tan^2\left(\frac{\pi x}{2}\right)}{\frac{\pi}{2}(3-2x)\sec^2\left(\frac{\pi x}{2}\right)}$$

$$= \lim_{x\to 1} \frac{4\ \frac{\sin^2\left(\frac{\pi x}{2}\right)}{\cancel{\cos^2\left(\frac{\pi x}{2}\right)}} \cdot \cancel{\cos^2\left(\frac{\pi x}{2}\right)}}{\pi(3-2x)}$$

$$= \frac{4(1)^2}{\pi} = \frac{4}{\pi} \quad \text{but,}$$

$$\lim_{x\to 1} y = e^{4/\pi}$$

The value(s) of c that satisfy(s) the conclusion of Rolle's Theorem of

$f(x) = \sin(x) - \cos(x), \quad x \in [0, \frac{3\pi}{2}]$ is

(A) $c = \frac{5\pi}{4}$

(B) $c = \frac{\pi}{4}$

(C) $c = \frac{7\pi}{4}$

(D) $c = \frac{3\pi}{4}$ and $c = \frac{5\pi}{4}$

(E) $c = \frac{3\pi}{4}$

15)

$$f'(x) = 0$$

$$\cos(x) - (-\sin(x)) = 0$$

$$\sin x = -\cos x$$ (الربع ٢، ٤)

$$x = \frac{3\pi}{4}, \frac{7\pi}{4}$$

✓ ✗

$$x = \frac{3\pi}{4} \rightsquigarrow \boxed{E}$$

The Slant asymptote of $f(x) = 5x + 3 + \frac{x+5}{x-1}$ is

(A) $y = 5x$

(B) $y = 5x + 3$

(C) $y = 5x + 4$

(D) $y = 5x + 2$

(E) $y = 5x + 5$

16)

$$\begin{array}{r|l} & \quad 1 \\ \hline x-1 & x+5 \\ & \ominus\ x-1 \\ \hline & \quad 6 \end{array}$$

$$\Rightarrow \quad f(x) = 5x + 3 + 1 + \frac{6}{x-1}$$

$$\boxed{y = 5x + 4} \rightsquigarrow \boxed{C}$$

$$\int \frac{dx}{\sqrt{16 - 9x^2}} =$$

(A) $\frac{1}{3}\sin^{-1}(3x) + C$

(B) $\frac{1}{12}\sin^{-1}(\frac{3x}{4}) + C$

(C) $\frac{1}{3}\sin^{-1}(\frac{3x}{4}) + C$

(D) $\frac{1}{3}\sin^{-1}(x) + C$

(E) $\frac{1}{4}\sin^{-1}(\frac{3x}{4}) + C$

17) $\int \frac{dx}{\sqrt{16-9x^2}}$

$$= \int \frac{dx}{\sqrt{16\left(1-\frac{9}{16}x^2\right)}}$$

$$= \int \frac{dx}{4\sqrt{1-\left(\frac{3}{4}x\right)^2}}\, dx$$

$$= \frac{1}{\cancel{4}} \cdot \frac{\sin^{-1}\left(\frac{3}{4}x\right)}{\frac{3}{\cancel{4}}} + c$$

$$= \frac{1}{3}\sin^{-1}\left(\frac{3}{4}x\right) + c \rightsquigarrow \boxed{C}$$

$$\frac{d}{dx}\left(\int_{\sin(x)}^{4} e^{t^3}\,dt\right) =$$

(A) $\cos(x)\ e^{\sin^3(x)}$

(B) $-\cos(x)\ e^{\sin^3(x)}$

(C) $-e^{\sin^3(x)}$

(D) $-\cos(x)\ e^{x^3}$

(E) 0

18) $= (e^{43})(0) - (e^{\sin^3 x})(\cos x)$

$= -\cos x\, e^{\sin^3 x} \rightsquigarrow \boxed{B}$