Question 1

Find y` from the following:

(a) $y = 3x^4 + 4^x - 4$ (b) $y = \sin 2x . \log(x + \sinh x)$ (c) $y = [x^2 + \cosh 2x]^4$

(d) $y = \dfrac{\sinh^{-1} x}{x + \ln x}$ (e) $y = x \sin y + \cos x^2$ (f) $y = t \sec t, \; x = t + \tan^{-2} t$

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Question 2

(a) Determine the maximum and minimum points of the function:

   $f(x) = 2x^3 - 15x^2 + 24x$

3

(b) Find the integral $\int (\cos 2x)^5 \, dx$

3

Question 3

Find the following integrals:

(a) $\int (3x^2 - \dfrac{3}{x} + 2^x) dx$ (b) $\int (2 - 3^x)^2 dx$ (c) $\int \dfrac{[1 + \ln x]^8}{x} \, dx$

(d) $\int (\dfrac{1 + e^x}{x + e^x} + \dfrac{2}{\sqrt{1 - x^2}}) dx$ (e) $\int \dfrac{x^2}{\sqrt{1 - x^2}} dx$ (f) $\int \sin^{-1} x \, dx$

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Question 4

(a) Compute the integral: $\displaystyle\int_{3}^{4} \dfrac{x}{x^2 - 3x + 2} \, dx$

3

(b) Find the area of the region between the curve $y = x^3 - 1$, x– axis, x in [0, 2]

3

(c) If the region between the curve $y = x^2 + 1$, x– axis, x in [0, 1], is rotated
about: (i) x– axis   (ii) y – axis.
Compute the volume of the generated solid in both cases.

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Good luck   *Dr. Mona Samir*   *Dr. Mohamed Eid*

[1] Find the following limits: **8**

$(a)\ \underset{x\to1}{\text{Lim}}\ \dfrac{x^5-1}{\sqrt[5]{x}-1}$ $(b)\ \underset{x\to0}{\text{Lim}}\ \dfrac{\tan^5 x}{x^6+4x^5}$ $(c)\ \underset{x\to0}{\text{Lim}}\ \dfrac{x+\tan 2x}{\sin 4x - x}$ $(d)\ \underset{x\to\infty}{\text{Lim}}\ \dfrac{\sqrt{x^2+3}}{2x+1}$

[2](a) Find the maximum and minimum points of : $f(x)=x^3-3x^2-9x$ **4**

(b) Find y` from the equation: $x^2 y^3 + 2\sin xy = 6x$ **4**

[3] Find y ` where: **14**

(a) $y=2x^3+3^x+4$ 　　　　　　　　(b) $y=4^{x^2}+\cos(x^3+3)$

(c) $y=\tan\ln x + \log(x+\sin x)$ 　　(d) $y=\sec x.\sin^{-1} x^2$

(e) $y=[\tan^{-1} x^3 + \tanh^{-1} x]^5$ 　(f) $y=\dfrac{x^3}{\cosh x + \cos x}$

(g) $y=t+\tan t^3,\quad x=t^2+\operatorname{sech} t$

Good luck　　　　*Dr. Mona Samir*　　　　　　*Dr. Mohamed Eid*

Group	ID		الاسم:

[1] Find the limits:

$(a) \underset{x \to 1}{\text{Lim}} \dfrac{x^4 - 1}{x^8 - 1}$ $(b) \underset{x \to 0}{\text{Lim}} \dfrac{x^3}{\sin x}$ $(c) \underset{x \to 0}{\text{Lim}} \dfrac{\ln(1 + x)}{3^x - 1}$ $(d) \underset{x \to \infty}{\text{Lim}} \dfrac{3x^2 - 2}{x^3 + 1}$

[2] Find y` where

(a) $y = 2x^3 + 3^x + \log x$ (b) $y = \sin x^2 . \ln(1 + \cos x)$ (c) $y = \dfrac{\cos x}{x^2 + 3} + (2 + 2^x)^8$

....

Answer

Group 5: C, D ID		الاسم:

[1] Find the limits:

(a) $\underset{x\to-1}{\text{Lim}}\dfrac{x^6-1}{x^7+1}$
(b) $\underset{x\to 0}{\text{Lim}}\dfrac{\tan 3x}{\sin x}$
(c) $\underset{x\to 0}{\text{Lim}}\dfrac{x^2}{2^x-1}$
(d) $\underset{x\to 0}{\text{Lim}}\dfrac{\sin 2x}{\ln(2+x)}$

[2] Find y` where

(a) $y=3\sqrt{x}+\sin 3x+\ln x$
(b) $y=\tan x^2 . \cosh 3x$
(c) $y=\dfrac{\sinh x}{\cos x^3}$

....

Answer

Group 7: A, B ID		الاسم:

[1] Find the limits:

$(a) \lim\limits_{x \to 1} \dfrac{\sqrt{x} - 2}{\sqrt{x} + 2}$ $(b) \lim\limits_{x \to 0} \dfrac{\tan x^3}{\sin x}$ $(c) \lim\limits_{x \to 0} \dfrac{\ln(1 + x)}{2^x - 1}$ $(d) \lim\limits_{x \to \infty} (x^2 - 2x)$

[2] Find y` where

(a) $y = x^4 + 4^{x^3}$ (b) $y = \tanh x^2 . \sin 2x$ (c) $y = \dfrac{\log x}{3 + x^3}$

....

Answer

Group 4: A	ID		الاسم:

[1] Find the limits:

$(a)\ \underset{x\to 2}{\text{Lim}}\dfrac{x^5-32}{x^6-64}$
$(b)\ \underset{x\to\infty}{\text{Lim}}\dfrac{x^2+2}{x^3-1}$
$(c)\ \underset{x\to 0}{\text{Lim}}\dfrac{x^3}{3^x-1}$
$(d)\ \underset{x\to 0}{\text{Lim}}\dfrac{\sin x^3}{\ln(1+x)}$

[2] Find y` where

$(a)\ y = x^4 + \ln\sin 4x$
$(b)\ y = \sec x^3 . \cosh 3x$
$(c)\ y = 3 + sinh^2 x^2$

....

<u>Answer</u>

| Group 4: B | ID | | الاسم: |

[1] Find the limits:

$(a)\ \underset{x\to 2}{\text{Lim}}\ \dfrac{x^5 - 32}{x^6 - 60}$ $\qquad$ $(b)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{\tan x^2}{x^3 + x^2}$ $\qquad$ $(c)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{2^x - 4^x}{3^x - 1}$ $\qquad$ $(d)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{\ln(1 + x^2)}{x}$

[2] Find y` where

(a) $y = 4^x + 3\cos 4x$ $\qquad$ (b) $y = \cosh 2^x . \sin 2x$ $\qquad$ (c) $y = 1 + ln^3 (3 + x)^3$

....

Answer

Group 4: C Group 6	ID		الاسم:

[1] Find the limits:

$(a)\ \underset{x\to\infty}{\text{Lim}}\ \dfrac{x^3 - 3}{x^2 + 3}$ $(b)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{\sin 2x}{x^2 + 2x}$ $(c)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{tan^2 x}{5^x - 1}$ $(d)\ \underset{x\to 0}{\text{Lim}}\ \dfrac{x^3}{\log(1 + x)}$

[2] Find y` where

(a) $y = \sin 4^x + \cosh 4x$ (b) $y = x^3 . 3^x$ (c) $y = [x + \log(\tanh x)]^3$

....

<u>Answer</u>