

EOT Math 12 Advanced
2024-2025-Term1
Unit 4: Application of Differentiation

NEVER
DREAM FOR
SUCCESS
BUT WORK
FOR IT

The only way to learn mathematics is to do mathematics.

Wishing you all the best 😊

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Find the linear approximation of a given function at a given

(1 – 6)

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Find the linear approximate to

$$Q1. \quad f(x) = \sqrt{x} \text{ at } x_0 = 1$$

$$A) L(x) = 2x + \frac{1}{2}$$

$$B) L(x) = \frac{1}{2}x + \frac{1}{2}$$

$$C) L(x) = \frac{1}{2}x + 2$$

$$D) L(x) = \frac{1}{2}x - \frac{1}{2}$$

Find the linear approximate to

$$Q2. \quad f(x) = (x + 1)^{1/3} \text{ at } x_0 = 0$$

$$A) L(x) = 3x + 1$$

$$B) L(x) = \frac{1}{3}x - 1$$

$$C) L(x) = \frac{1}{3}x + 1$$

$$D) L(x) = -\frac{1}{3}x + 1$$

Find the linear approximate to

$$Q3. \quad f(x) = \sqrt{2x + 9} \text{ at } x_0 = 0$$

$$A) L(x) = 3 + \frac{1}{3}x$$

$$B) L(x) = 3 - \frac{1}{3}x$$

$$C) L(x) = \frac{1}{3}x - 3$$

$$D) L(x) = 3 - x$$

Find the linear approximate to

$$Q4. \quad f(x) = \frac{2}{x} \text{ at } x_0 = 1$$

$$A) L(x) = -4 - 2x$$

$$B) L(x) = 4 + 2x$$

$$C) L(x) = 2x - 4$$

$$D) L(x) = 4 - 2x$$



Find the linear approximate to

Q5. $f(x) = \sin 3x$ at $x_0 = 0$

A) $L(x) = -3x$	B) $L(x) = 3$
C) $L(x) = 1 + 3x$	D) $L(x) = 3x$

Find the linear approximate to

Q6. $f(x) = \sin x$ at $x_0 = \pi$

A) $L(x) = x - \pi$	B) $L(x) = \pi + x$
C) $L(x) = -\pi - x$	D) $L(x) = \pi - x$

Find the linear approximation to estimate

Q6. $\sin(0.3)$

A) 3	B) 0.3
C) 2	D) 0.2

Find the linear approximation to estimate

Q2. $\sqrt[3]{1.2}$

A) 1.4	B) 0.0667
C) 1.0667	D) 1.006

Find the linear approximation to estimate

Q2. $\frac{2}{0.99}$

A) 2.2	B) 2
C) 2.002	D) 2.02

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Use l'Hopital's rule to compute limits in various cases

(1 – 12)

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Evaluate

Q1). $\lim_{x \rightarrow -2} \frac{x+2}{x^2-4}$

A) -0.24 B) -4 C) $\frac{1}{4}$ D) $-\frac{1}{4}$ **Evaluate**

Q2). $\lim_{x \rightarrow 2} \frac{x^2-4}{x^2-3x+2}$

A) ∞ B) -1 C) 1 D) $-\infty$ **Evaluate**

Q3) $\lim_{x \rightarrow \infty} \frac{3x^2+2}{x^2-4}$

A) $\frac{1}{3}$ B) -3 C) 3 D) $-\frac{1}{3}$ 

Evaluate

$$Q4). \quad \lim_{x \rightarrow -\infty} \frac{x+1}{x^2+4x+3}$$

A) $-\infty$ B) ∞

C) 0

D) 9.9

Evaluate

$$Q5). \quad \lim_{t \rightarrow 0} \frac{e^{2t} - 1}{t}$$

A) $\frac{1}{2}$ B) -2

C) 2

D) $-\frac{1}{2}$

Evaluate

$$Q6). \quad \lim_{t \rightarrow 0} \frac{\sin t}{e^{3t} - 1}$$

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

B) 3

C) $-\frac{1}{3}$ D) -3

Evaluate

$$Q7). \quad \lim_{t \rightarrow 0} \frac{\tan^{-1} t}{\sin t}$$

A) 1

B) -1 C) $-\infty$ D) ∞

Evaluate

Q8). $\lim_{t \rightarrow 0} \frac{\sin t}{\sin^{-1} t}$

A) -1 B) 1 C) 0 D) ∞

Evaluate

Q9) $\lim_{x \rightarrow \pi} \frac{\sin 2x}{\sin x}$

A) ∞ B) -2 C) $-\infty$ D) 2

Evaluate

Q10) $\lim_{x \rightarrow -1} \frac{\cos^{-1} x}{x^2 - 1}$

A) $-\infty$ B) ∞ C) -1 D) DNE

Evaluate

Q11). $\lim_{x \rightarrow 0} \frac{\sin x - x}{x^3}$

A) $-\frac{1}{6}$ B) $\frac{1}{6}$ C) -0.1 D) 0.1

Evaluate

Q12). $\lim_{x \rightarrow 0} \frac{\tan x - x}{x^3}$

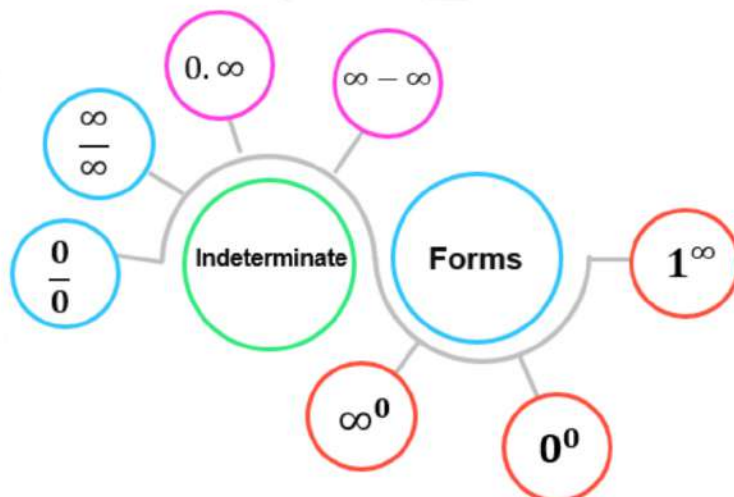
A) 3

B) $-\frac{1}{3}$

C) -3

D) $\frac{1}{3}$

Indeterminate Forms



Q36) $\lim_{x \rightarrow 1} \frac{\sqrt{5-x}-2}{\sqrt{10-x}-3}$

Q30) $\lim_{x \rightarrow 0^+} \frac{\sqrt{x}}{\ln x}$

If we get ∞^0 , 0^0 , or 1^∞

Q33) $\lim_{x \rightarrow \infty} (1 + \frac{1}{x})^x$

Q40) $\lim_{t \rightarrow \infty} (\frac{t-3}{2t+1})^t$

Note:

$$\lim_{x \rightarrow \infty} (1 + \frac{a}{x})^x = e^a$$

Q37) $\lim_{x \rightarrow 0^+} \left(\frac{1}{x}\right)^x$

Q38) $\lim_{x \rightarrow 0^+} (\cos x)^{1/x}$

Q31) $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - x)$

Q32) $\lim_{x \rightarrow \infty} (\ln x - x)$

Q34) $\lim_{x \rightarrow \infty} \left| \frac{x+1}{x-2} \right|^{\sqrt{x^2-4}}$

Q39) $\lim_{x \rightarrow \infty} \left(\frac{t-3}{t+2} \right)^t$

