

اختبر نفسك (3)  
Check yourself (3)

Mathematics الرياضيات

الصف الثاني عشر متقدم

الفصل الأول T1

2024-5202

مراجعة الدرس الثالث (الجزء الثاني)

Lesson 2-3

COMPUTATION OF LIMITS

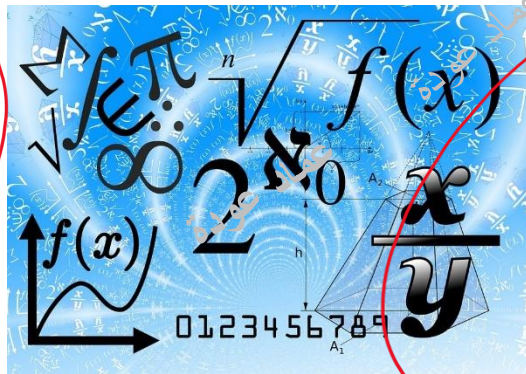
حساب النهايات

من الوحدة الثانية اعتمادا على الاختبارات السابقة

According to the previous exam

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<https://t.me/+v1n4wuNV2B83NDA0>

<http://www.youtube.com/@imaths2022>

Q1 Evaluate

س1 اوجد

$$\lim_{x \rightarrow 0} \frac{\sin 3x}{2x} = \frac{3}{2}$$

A) 1

Imad Odeh

Imad Odeh

Imad Odeh

B) 3

C)  $\frac{3}{2}$ 

D) does not exist

Q2 Evaluate

س2 اوجد

$$\lim_{x \rightarrow 0} \frac{\tan x}{5x} = \frac{1}{5}$$

A) 5

Imad Odeh

Imad Odeh

Imad Odeh

B) 0

C)  $\frac{1}{5}$ 

D) does not exist

Q3 Evaluate

س3 اوجد

$$\lim_{x \rightarrow 0} \frac{\sin 2x}{\tan 3x} = \frac{2}{3}$$

A) 1

Imad Odeh

Imad Odeh

Imad Odeh

B)  $\frac{2}{3}$ C)  $\frac{3}{2}$ 

D) does not exist

Q4 Evaluate

س4 اوجد

$$\lim_{x \rightarrow 0} \frac{2x}{\tan x} = \frac{2}{1} = 2$$

A) 2

Imad Odeh

Imad Odeh

Imad Odeh

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

C) 0

D) does not exist

## Q5 Evaluate

س5 اوجد

$$\lim_{x \rightarrow 0} x^2 \csc^2 x =$$

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

- A) 1  
B) 2  
C) 0  
D) Does not exist

$$\lim_{x \rightarrow 0} \frac{x^2}{\sin^2 x} = 1$$

## Q6 Evaluate

س6 اوجد

$$\lim_{x \rightarrow 0} (x \cot x)$$

$$\cot x = \frac{1}{\tan x}$$

- A) 1  
B) -1  
C) 0  
D) Does not exist

$$\lim_{x \rightarrow 0} \frac{x}{\tan x} = 1$$

## Q7 Evaluate

س7 اوجد

$$\lim_{x \rightarrow 0} \left( \frac{xe^x}{\tan x} \right)$$

- A) 1  
B) -1  
C) 0  
D) Does not exist

$$= \lim_{x \rightarrow 0} \frac{x}{\tan x} \cdot \lim_{x \rightarrow 0} e^x = 1 \cdot 1 = 1$$

## Q8 Evaluate

س8 اوجد

$$\lim_{x \rightarrow 0} \frac{x \sin 3x}{\sin^2 5x}$$

- A)  $\frac{3}{5}$   
B)  $\frac{3}{25}$   
C) 0  
D) Does not exist

$$\lim_{x \rightarrow 0} \frac{x}{\sin 5x} \cdot \lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x} = \frac{1}{5} \cdot \frac{3}{5} = \frac{3}{25}$$

## Q9 Evaluate

س9 اوجد

$$\lim_{\theta \rightarrow 0} \frac{\theta + \theta \cos \theta}{\sin \theta \cos \theta}$$

- A)  $\frac{1}{4}$   
B) 1  
C)  $\frac{1}{2}$   
D) 2

$$\lim_{\theta \rightarrow 0} \frac{\theta}{\sin \theta \cos \theta} + \lim_{\theta \rightarrow 0} \frac{\theta \cos \theta}{\sin \theta \cos \theta} = \lim_{\theta \rightarrow 0} \frac{\theta}{\sin \theta} \cdot \frac{1}{\cos \theta} + \lim_{\theta \rightarrow 0} \frac{\theta}{\sin \theta} = 1 \cdot 1 + 1 = 2$$

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## Q10 Evaluate

10س

$$\lim_{x \rightarrow 0} \frac{\sin |x|}{x}$$

$$\frac{-x}{x}$$

A) 1

B) -1

C) 2

D) does not exist

Imad Odeh

Imad Odeh

Imad Odeh

$$\lim_{x \rightarrow 0^-} \frac{\sin(-x)}{x} = -1 \quad \lim_{x \rightarrow 0^+} \frac{\sin x}{x} = 1$$

$$\lim_{x \rightarrow 0} \frac{\sin |x|}{x} = \text{Does not exist}$$

## Q11 find value of k if

11س

$$\lim_{x \rightarrow 0} \frac{\sin kx}{3x} = 2$$

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Imad Odeh

Imad Odeh

Imad Odeh

A) 2

B) 3

C)  $\frac{1}{6}$ D)  $\frac{6}{6}$ 

D) 6

$$= \frac{k}{3} = 2$$

$$k = 6$$

## Q12 evaluate

12س

$$\lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x^2}$$

$$\sin^2 x = 1 - \cos^2 x$$

Imad Odeh

Imad Odeh

Imad Odeh

Imad Odeh

A) 2

B) 1

C) 0

D) Does not exist

$$\lim_{x \rightarrow 0} \frac{\sin^2 x}{x^2} = 1$$

## Q13 evaluate

13س

$$\lim_{x \rightarrow 0} \frac{x^2}{\cos^2 x - 1}$$

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Imad Odeh

Imad Odeh

Imad Odeh

A) -1

B) 1

C) 0

D) Does not exist

$$\lim_{x \rightarrow 0} \frac{x^2}{-\sin^2 x} = -1$$

Q14 evaluate

س14

$$\lim_{x \rightarrow 0} \frac{\cos^2 x - 1}{2x^2}$$

Imad Odeh

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

Imad Odeh

$$\lim_{x \rightarrow 0} \frac{-\sin^2 x}{2x^2} = -\frac{1}{2}$$

Imad Odeh

Imad Odeh

Q15 evaluate

س15

$$\lim_{x \rightarrow 0} \frac{\cos x - 1}{x \sin x}$$

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Imad Odeh

- A)  $-\frac{1}{2}$   
 B) 2  
 C) 0  
 D) Does not exist

Imad Odeh

Imad Odeh

Imad Odeh

$$\begin{aligned} \lim_{x \rightarrow 0} \frac{\cos x - 1}{x \sin x} \cdot \frac{\cos x + 1}{\cos x + 1} &= \lim_{x \rightarrow 0} \frac{\cos^2 x - 1}{x \sin x (\cos x + 1)} \\ &= \lim_{x \rightarrow 0} \frac{-\sin^2 x}{x \sin x} \cdot \frac{1}{\cos x + 1} \\ &= \lim_{x \rightarrow 0} \frac{-\sin x}{x} \cdot \frac{1}{\cos x + 1} \\ &= -1 \cdot \frac{1}{2} = -\frac{1}{2} \end{aligned}$$

Q16 evaluate

س16

$$\lim_{x \rightarrow 0} \frac{x \sin x}{1 - \cos x}$$

مقلوب السوال رتبة مع رتبة للدالة

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- A)  $\frac{1}{2}$   
 B) 2  
 C) 0  
 D) Does not exist

Imad Odeh

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Imad Odeh

$$= 2$$

Q17 Evaluate

س17

$$\lim_{x \rightarrow 0} \frac{\sqrt{\sec^2 x - 1}}{x} =$$

$$\sec^2 x - 1 = \tan^2 x$$

Imad Odeh

- A) 1  
 B) -1  
 C) 0  
 D) Does not exist

Imad Odeh

Imad Odeh

Imad Odeh

$$\begin{aligned} \lim_{x \rightarrow 0} \frac{\sqrt{\tan^2 x}}{x} &= \lim_{x \rightarrow 0} \frac{|\tan x|}{x} = D.N.E \\ \frac{-\tan x}{0} \cdot \frac{+\tan x}{+\tan x} &\Rightarrow \lim_{x \rightarrow 0^-} \frac{-\tan x}{x} = -1 \quad \lim_{x \rightarrow 0^+} \frac{+\tan x}{x} = 1 \end{aligned}$$

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## Q18 Evaluate

س18

$$\lim_{x \rightarrow 0} \frac{x^2}{3 \sec x - 3} = \frac{1}{3} \lim_{x \rightarrow 0} \frac{x^2}{\sec x - 1}$$

الخط الرابع

Imad Odeh

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

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

C)  $\frac{3}{2}$

D) Does not exist

Imad Odeh

$$\frac{1}{3} \lim_{x \rightarrow 0} \frac{x^2}{\sec x - 1} \cdot \frac{\sec x + 1}{\sec x + 1}$$

$$\frac{1}{3} \lim_{x \rightarrow 0} \frac{x^2}{\sec^2 x - 1} \cdot \sec x + 1$$

$$\frac{1}{3} \lim_{x \rightarrow 0} \frac{x^2}{\tan^2 x} \cdot (\sec x + 1) = \frac{1}{3} (1) \cdot (1+1) = \frac{2}{3}$$

## Q19 Evaluate

س19

$$\lim_{x \rightarrow \frac{\pi}{3}} \frac{\sin(\frac{\pi}{3} - x)}{\frac{\pi}{3} - x}$$

$$\text{let } u = \frac{\pi}{3} - x$$

$$x \rightarrow \frac{\pi}{3} \quad u \rightarrow 0$$

Imad Odeh

A) -1

B) 0

C)  $\frac{\sqrt{3}}{2}$

D) 1

Imad Odeh

$$\lim_{u \rightarrow 0} \frac{\sin u}{u} = 1$$

Imad Odeh

Imad Odeh

## Q20 Evaluate

س20

$$\lim_{x \rightarrow 2} \frac{\sin(x^2 - 4)}{x^2 - 4}$$

$$u = x^2 - 4$$

$$x \rightarrow 2 \quad u \rightarrow 0$$

Imad Odeh

A) 1

B) 2

C)  $\frac{1}{4}$

D) does not exist

Imad Odeh

$$\lim_{u \rightarrow 0} \frac{\sin u}{u} = 1$$

Imad Odeh

Imad Odeh

## Q21 Evaluate

س21

$$\lim_{x \rightarrow 0} \sin^{-1}\left(\frac{\sqrt{x+3}}{2}\right)$$

Imad Odeh

A)  $\frac{\pi}{6}$

B)  $\frac{\pi}{3}$

C)  $\frac{3\pi}{2}$

D) Does not exist

Imad Odeh

$$\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$$

Imad Odeh

Imad Odeh

## Q22 Evaluate

س22

$$\lim_{x \rightarrow 0} \sin^{-1}\left(\frac{x+1}{2}\right)$$

Imad Odeh

Imad Odeh

Imad Odeh

Imad Odeh

A)  $\frac{\pi}{6}$

B)  $\frac{\pi}{3}$

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

D) Does not exist

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

## Q23 Evaluate

س23

$$\lim_{x \rightarrow 0} \cos^{-1}(x^2) =$$

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Imad Odeh

Imad Odeh

A)  $\frac{\pi}{6}$

B)  $\frac{\pi}{3}$

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

D) Does not exist

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

## Q24 evaluate

س24

$$\lim_{x \rightarrow 0} \frac{\sin x}{1 - \sqrt{1+x}}$$

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Imad Odeh

$$\lim_{x \rightarrow 0} \frac{\sin x}{1 - \sqrt{1+x}} \cdot \frac{1 + \sqrt{1+x}}{1 + \sqrt{1+x}}$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{1 - (1+x)} \cdot (1 + \sqrt{1+x})$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} (1 + \sqrt{1+x}) = 1 \cdot (1 + \sqrt{1}) = 2$$

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$$(\sin x + 2x) \leq x f(x) \leq x^2 + 3x$$

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

احسن لك x

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- A) 1  
B) 0  
C) 3  
D) Does not exist

$$\frac{\sin x + 2x}{x} \leq f(x) \leq \frac{x^2 + 3x}{x}$$

$$\frac{\sin x}{x} + 2 \leq f(x) \leq x + 3$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} + 2 \leq \lim_{x \rightarrow 0} f(x) \leq \lim_{x \rightarrow 0} x + 3$$

$$1 + 2 < \lim_{x \rightarrow 0} f(x) \leq 3$$

$$\lim_{x \rightarrow 0} f(x) = 3$$

$$|g(x) + 4| \leq 2(2 - x)$$

$$\lim_{x \rightarrow 2} g(x)$$

تذكر ان

$$|x| \leq a$$

$$-a < x < a$$

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- A) -4  
B) 0  
C) 2  
D) 4

$$-2(2-x) \leq g(x) + 4 \leq 2(2-x)$$

$$-2(2-x) - 4 \leq g(x) \leq 2(2-x) - 4$$

$$\lim_{x \rightarrow 2} -2(2-x) - 4 \leq \lim_{x \rightarrow 2} g(x) \leq \lim_{x \rightarrow 2} 2(2-x) - 4$$

$$-4 \leq \lim_{x \rightarrow 2} g(x) \leq -4$$

$$\therefore \lim_{x \rightarrow 2} g(x) = -4$$

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$$|g(x) - 4| \leq 2(2 - x)$$

$$\lim_{x \rightarrow 2} g(x)$$

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- A) -4  
B) 0  
C) 2  
D) 4

ففس لسر ال اب بة  
مع تغير ال ا ب ت ر د

$$\lim_{x \rightarrow 0} \left[ x^2 \cos \left( \frac{1}{x} \right) \right].$$

معلوم أن  $-1 \leq \cos \frac{1}{x} \leq 1$  بالقرينة  $x^2$

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$$-x^2 \leq x^2 \cos \frac{1}{x} \leq x^2$$

$$\lim_{x \rightarrow 0} -x^2 \leq \lim_{x \rightarrow 0} x^2 \cos \frac{1}{x} \leq \lim_{x \rightarrow 0} x^2$$

$$0 \leq \lim_{x \rightarrow 0} x^2 \cos \frac{1}{x} \leq 0 \Rightarrow \lim_{x \rightarrow 0} x^2 \cos \frac{1}{x} = 0$$

$$\lim_{x \rightarrow 0^+} \left[ \sqrt{x} \sin^2 \left( \frac{1}{x} \right) \right].$$

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Prove that

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$$|f(x)| \leq 4$$

$$\lim_{x \rightarrow 0} x^2 f(x) = 0$$

$$|f(x)| \leq 4$$

$$-4 \leq f(x) \leq 4$$

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Imad Odeh

$$-4x^2 \leq x^2 f(x) \leq 4x^2$$

$$\lim_{x \rightarrow 0} -4x^2 \leq \lim_{x \rightarrow 0} x^2 f(x) \leq \lim_{x \rightarrow 0} 4x^2$$

$$0 \leq \lim_{x \rightarrow 0} x^2 f(x) \leq 0$$

$$\therefore \lim_{x \rightarrow 0} f(x) = 0 //$$

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Find

 $x^2$  is small

$$\frac{2x^2 - x^3}{2} \leq x^2 f(x) \leq \frac{x^2 + \sin^2 x}{2}$$

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

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$$\frac{2x^2 - x^3}{2x^2} \leq \frac{x^2}{x^2} f(x) \leq \frac{x^2 + \sin^2 x}{2x^2}$$

$$\frac{2x^2}{2x^2} - \frac{x^3}{2x^2} \leq f(x) \leq \frac{x^2}{2x^2} + \frac{\sin^2 x}{2x^2}$$

$$1 - \frac{x}{2} \leq f(x) \leq \frac{1}{2} + \frac{\sin^2 x}{2x^2}$$

$$\lim_{x \rightarrow 0} 1 - \frac{x}{2} \leq \lim_{x \rightarrow 0} f(x) \leq \lim_{x \rightarrow 0} \left( \frac{1}{2} + \frac{\sin^2 x}{2x^2} \right)$$

$$1 \leq \lim_{x \rightarrow 0} f(x) \leq \frac{1}{2} + \frac{1}{2}$$

$$\lim_{x \rightarrow 0} f(x) = 1$$

$$(x^2 - 1)(x^2 + 1) \leq (x - 1)f(x) \leq (x^2 + 2x - 3) \text{ Where } x \neq 1, [-3, 3]$$

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Imad Odeh

Find

$$\lim_{x \rightarrow 1} f(x)$$

 $(x-1)$  is small

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

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

$$\lim_{x \rightarrow 1} (x+1)(x^2+1) \leq \lim_{x \rightarrow 1} f(x) \leq \lim_{x \rightarrow 1} (x+3)$$

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$$(2)(2) \leq \lim_{x \rightarrow 1} f(x) \leq 1+3$$

$$4 \leq \lim_{x \rightarrow 1} f(x) \leq 4$$

$$\therefore \lim_{x \rightarrow 1} f(x) = 4$$

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$$\frac{1}{32}(x^2 - 16) \leq (x - 4)f(x) \leq \sqrt{x} - 2, \quad x \neq 4$$

Find

$$\lim_{x \rightarrow 4} f(x)$$

نسبة  $x-4$ 

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$$\frac{1}{32} \frac{x^2 - 16}{x - 4} \leq \cancel{x-4} f(x) \leq \frac{\sqrt{x} - 2}{x - 4}$$

$$\lim_{x \rightarrow 4} \frac{1}{32} \frac{x^2 - 16}{x - 4} \leq \lim_{x \rightarrow 4} f(x) \leq \lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$$

$$\lim_{x \rightarrow 4} \frac{1}{32} \frac{(x-4)(x+4)}{x-4} \leq \lim_{x \rightarrow 4} f(x) \leq \lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} \cdot \frac{\sqrt{x} + 2}{\sqrt{x} + 2}$$

$$\lim_{x \rightarrow 4} \frac{1}{32} (x+4) \leq \lim_{x \rightarrow 4} f(x) \leq \lim_{x \rightarrow 4} \frac{(x-4)}{x-4} \cdot \frac{1}{\sqrt{x} + 2}$$

$$\frac{1}{4} \leq \lim_{x \rightarrow 4} f(x) \leq \frac{1}{4}$$

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$$= \lim_{x \rightarrow 4} f(x) = \frac{1}{4}$$

XX

$$|g(x) + 4| \leq 2(3 - x)^4 \text{ is true for all value of } x$$

Find

$$\lim_{x \rightarrow 3} g(x)$$

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26/27/30

اطيب التمنيات للجميع



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