



10)) Apply the Quotient Rules on derivatives

Find the derivative of the function

$$f(x) = \frac{6x}{\sqrt{x+1}}$$

أوجد مشتقة الدالة

$$f(x) = \frac{6x}{\sqrt{x+1}}$$

- A) $f'(x) = \frac{3\sqrt{x} - 6}{(\sqrt{x} + 1)^2}$
- B) $f'(x) = \frac{6\sqrt{x} + 6}{(\sqrt{x} + 1)^2}$
- C) $f'(x) = \frac{3\sqrt{x} + 6}{(\sqrt{x} + 1)^2}$
- D) $f'(x) = \frac{6 - 3\sqrt{x}}{(\sqrt{x} + 1)^2}$

11)) Find horizontal, vertical, and slant asymptotes using limits

Determine all vertical and slant

asymptotes of $f(x) = \frac{x^3}{4-x^2}$.

حدد كل خطوط التقارب الرأسية والمائلة لـ

$$f(x) = \frac{x^3}{4-x^2}$$

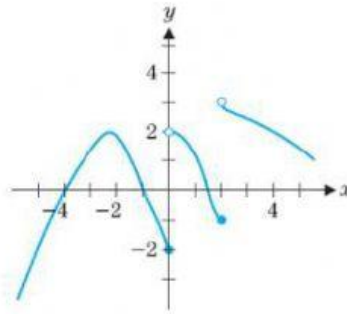
- A) $x = 4, y = -x$
- B) $x = -2, x = 2, y = 4x$
- C) $x = -2, x = 2, y = x$
- D) $x = -2, x = 2, y = -x$



12)) Find the limit of a function algebraically and graphically if it exists

Use the graph to determine $\lim_{x \rightarrow 2^-} f(x)$.

استخدم التمثيل البياني لتحديد $\lim_{x \rightarrow 2^-} f(x)$.



- A) **-1**
- B) **-2**
- C) **2**
- D) **3**

13)) Find the derivatives of trigonometric functions using differentiation rules

Find the derivative of the function

أوجد مشتقة الدالة

$$f(x) = \tan 3x - \csc^2 x.$$

$$f(x) = \tan 3x - \csc^2 x$$

- A) $f'(x) = 3 \sec^2 3x + 2 \csc^2 x \cot x$
- B) $f'(x) = 3 \sec^2 3x \tan 3x + 2 \csc x \cot x$
- C) $f'(x) = 3 \sec^2 3x - 2 \csc^2 x \cot x$
- D) $f'(x) = 3 \sec^2 3x \tan 3x - 2 \csc x \cot x$



14))

Find limits for polynomials, rational, and trigonometric functions using theorems

Evaluate $\lim_{x \rightarrow 0} \frac{1-e^{2x}}{1-e^x}$.

$\lim_{x \rightarrow 0} \frac{1-e^{2x}}{1-e^x}$ أوجد قيمة

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

15))

Find limits for polynomials, rational, and trigonometric functions using theorems

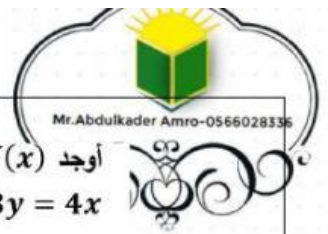
Given that $\lim_{x \rightarrow 0^+} \frac{1-\cos x}{x^2} = \frac{1}{2}$,

$\lim_{x \rightarrow 0^+} \frac{1-\cos x}{x^2} = \frac{1}{2}$ إذا كانت النهاية

evaluate $\lim_{x \rightarrow 0^+} \frac{\sqrt{1-\cos x}}{x}$.

$\lim_{x \rightarrow 0^+} \frac{\sqrt{1-\cos x}}{x}$ أوجد قيمة

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



16))

Find derivatives implicitly

Find $y'(x)$ implicitly for

$$x^2y^2 + 3y = 4x.$$

أوجد $y'(x)$ ضمناً لـ

$$.x^2y^2 + 3y = 4x$$

A) $y'(x) = \frac{4 - 2xy^2}{2x^2y + 3}$

B) $y'(x) = \frac{4 - 2xy}{x^2 + 3}$

C) $y'(x) = \frac{4 - 2xy^2}{2x^2y - 3}$

D) $y'(x) = \frac{4 - 2xy}{x^2 - 3}$

17))

Use the continuity properties to study the continuity of a function

Determine the interval(s) where

$$f(x) = \sqrt{9 - x^2} \text{ is continuous.}$$

حدّد الفترة (الفترات) التي تكون عندها

$$f(x) = \sqrt{9 - x^2} \text{ متصلة.}$$

A) $(-3, 3)$

B) $[-3, 3]$

C) $(-\infty, -3] \cup [3, \infty)$

D) $(-\infty, -3) \cup (3, \infty)$



18)) Find infinite limits and limits at infinity

Evaluate $\lim_{x \rightarrow \frac{\pi^-}{2}} e^{\tan x}$.

$\lim_{x \rightarrow \frac{\pi^-}{2}} e^{\tan x}$ أوجد قيمة

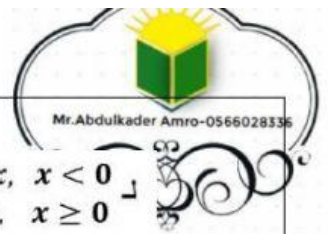
- A) $-\infty$
- B) **0**
- C) **1**
- D) ∞

19)) Find the derivative of a function at a given point using the Power Rule

Find all values of x for which the tangent line to $y = x^3 - 2x + 1$ is at an angle of 45° with the x - axis, assuming that the angle is measured counterclockwise.

أوجد جميع قيم x والتي يشكل عندها المماس على منحنى $y = x^3 - 2x + 1$ زاوية قياسها 45° مع المحور x ، على فرض أن الزاوية تقاس باتجاه معاكس لعقارب الساعة.

- A) $x = -\sqrt{2}, x = -1$
- B) $x = 1, x = \sqrt{2}$
- C) $x = -1, x = 1$
- D) $x = -\sqrt{2}, x = \sqrt{2}$



20)) Understand the relationship between continuity and differentiability

For $f(x) = \begin{cases} x^2 + 2x, & x < 0 \\ ax + b, & x \geq 0 \end{cases}$

Find all real numbers a and b such that $f'(0)$ exists.

$$f(x) = \begin{cases} x^2 + 2x, & x < 0 \\ ax + b, & x \geq 0 \end{cases}$$

أوجد جميع الأعداد الحقيقية a و b بحيث يكون $f'(0)$ موجودًا.

- A) $a = -2, b = 0$
 B) $a = 0, b = -2$
 C) $a = 0, b = 2$
 D) $a = 2, b = 0$