

Suppose that the height of a falling object t seconds after being dropped from a height of 64 ft is given by $s(t) = 64 - 16t^2$ ft.

Find the average velocity between times $t = 1$ and $t = 2$.

لأن ارتفاع جسم يسقط بعد t ثانية من
ارتفاع 64 ft، تمثله المعادلة
 $s(t) = 64 - 16t^2$. أوجد السرعة المتجهة
بين الزمنين $t = 1$ و $t = 2$.

Learning Outcomes Covered

- MAT.6.02.03.001

a.

−24 ft/s



b.

−6 ft/s



c.

−36 ft/s



d.

−48 ft/s



Use logarithmic differentiation to find the derivative of $f(x) = (\sin x)^x$.

فاضل اللوغاريتم لإيجاد مشتقة الدالة $f(x) = (\sin x)^x$.

Learning Outcomes Covered

○ MAT.6.02.06.004

a.

$$f'(x) = (\sin x)^x \cdot (x \cot x + \ln(\sin x))$$



b.

$$f'(x) = (x \cot x + \ln(\sin x))$$



c.

$$f'(x) = (\sin x)^x \cdot (x + \ln(\sin x))$$



d.

$$f'(x) = (\sin x)^x \cdot (x \cot x)$$



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

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

Learning Outcomes Covered

- MAT.6.04.02.002

a.

0



b.

$-\frac{1}{6}$



c.

∞



d.

6



Estimate the arc length of the curve

$f(x) = x^3 + 2$ on the interval

$-1 \leq x \leq 1$ using $n = 2$ line

segments.

قوس المنحنى $f(x) = x^3 + 2$

$-1 \leq x \leq 1$ باستخدام $n = 2$

تقريباً.

Learning Outcomes Covered

○ MAT.5.06.07.002

a.

$$2\sqrt{2}$$



b.

$$\sqrt{2}$$



c.

$$\sqrt{6}$$



d.

$$2$$



Evaluate $\lim_{x \rightarrow 1} \frac{x + \sqrt{x} - 2}{x - 1}$.

$\lim_{x \rightarrow 1} \frac{x + \sqrt{x} - 2}{x - 1}$;

Learning Outcomes Covered

- MAT.6.01.07.004

a.

0



b.

$\frac{3}{2}$



c.

2



d.

$\frac{2}{3}$



Determine the interval(s) where

$f(x) = \frac{\ln(1-x^2)}{\sqrt{x}}$ is continuous.

(الفترات) التي تكون عندها
 $f(x)$ متصلة.

Learning Outcomes Covered

○ MAT.6.01.08.001

a.

$(0, \infty)$



b.

$(0, 1)$



c.

$(-1, 1)$



d.

$(1, \infty)$



Find all values of x for which the tangent line to $y = x^4 - 2x^2 + 3$ is horizontal.

مع قيم x والتي يكون عندها المماس على $y = x^4 - 2x^2 + 3$ أفقيًا.

Learning Outcomes Covered

○ MAT.6.02.05.002

a.

$$x = -1, x = 2$$



b.

$$x = 1, x = \sqrt{3}$$



c.

$$x = -1, x = 0, x = 1$$



d.

$$x = -\sqrt{2}, x = \sqrt{2}$$



Find the linear approximation to

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

يب الخطي للدالة

f عند $x_0 = 1$.

Learning Outcomes Covered

◦ MAT.6.04.01.001

a.

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



b.

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



c.

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



d.

$$L(x) = 6 - 2x$$



If $f(x) = \frac{9-x^2}{mx+2}$ is continuous on $(-\infty, \infty)$, find the value of m , where m is a constant number.

$f(x) = \frac{9-x^2}{mx+2}$ متصلة على $(-\infty, \infty)$ ، حيث m عدد ثابت.

Learning Outcomes Covered

- MAT.6.01.08.002

a.

-1



b.

0



c.

9



d.

1



Find the derivative of the function

$$f(x) = \sin^2(\tan x)$$

ثقة الدالة

$$f(x) = \sin^2(\tan x)$$

Learning Outcomes Covered

○ MAT.6.02.06.001

a.

$$f'(x) = 2 \sin(\tan x) \cdot \cos(\tan x) \cdot \sec^2 x$$



b.

$$f'(x) = 2 \sin x \cdot (\tan x) \cdot \cos x + \sec^2 x \cdot \sin^2 x$$



c.

$$f'(x) = 2 \sin(\tan x) \sec^2 x$$



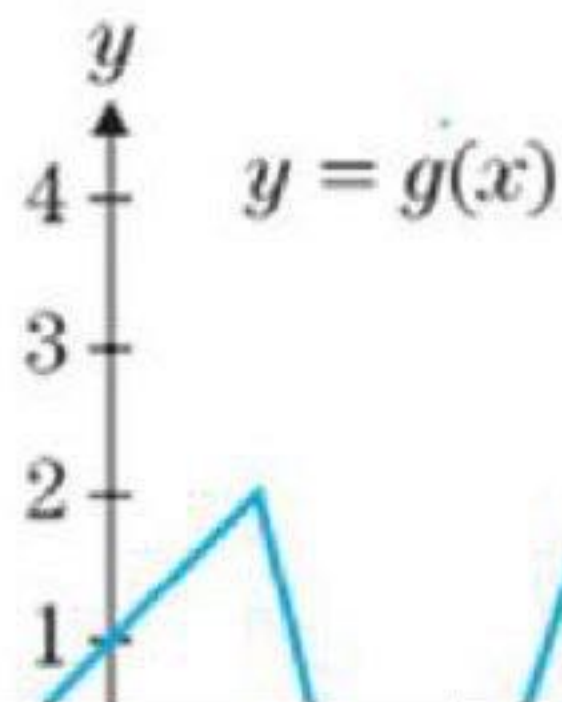
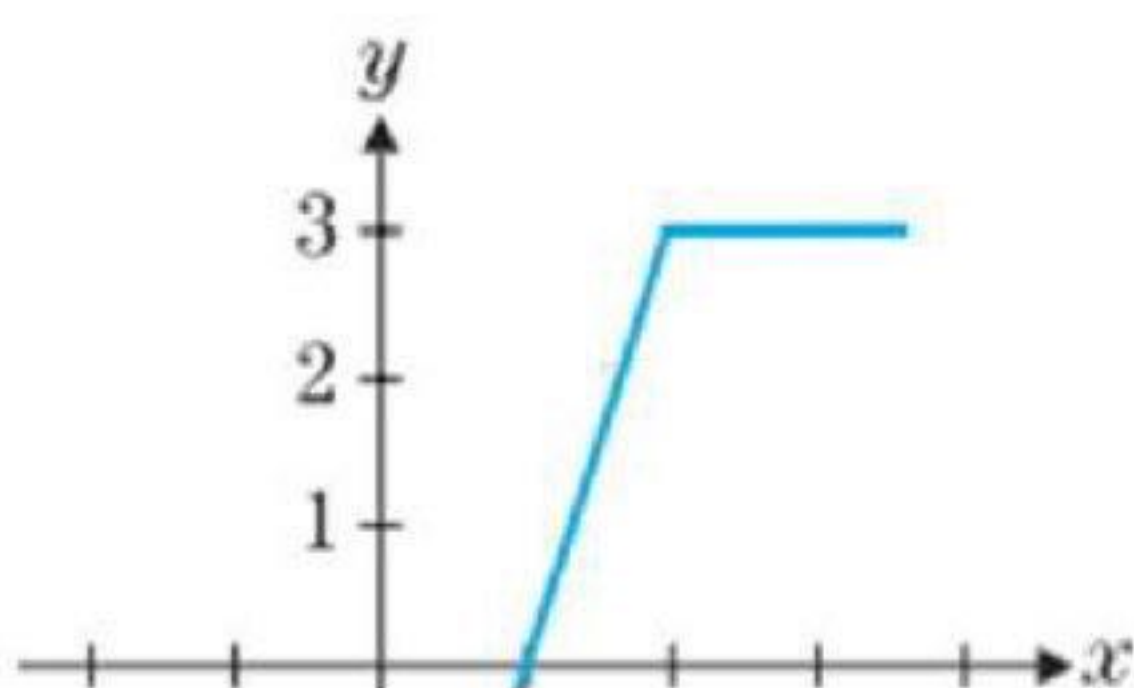
d.

$$f'(x) = 2 \sin(\tan x) \cdot \cos x \cdot \sec^2 x$$



Use the graphs to find the derivative of the composite function $f(g(x))$ at $x = 3$.

ثيلات البيانية لإيجاد مشتقة الدالة $f(g(x))$ عند $x = 3$.



Learning Outcomes Covered

○ MAT.6.02.05.008

a.

0



b.

3



c.

9



d.

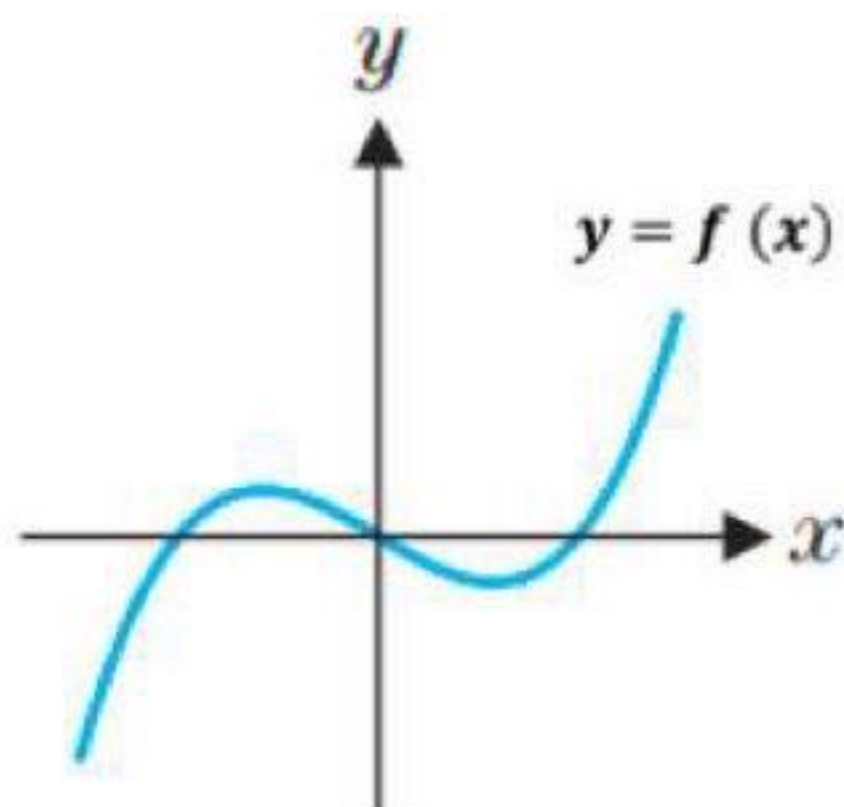
غير موجودة

does not exist



Use the graph of $y = f(x)$ to sketch a graph of $y = f'(x)$.

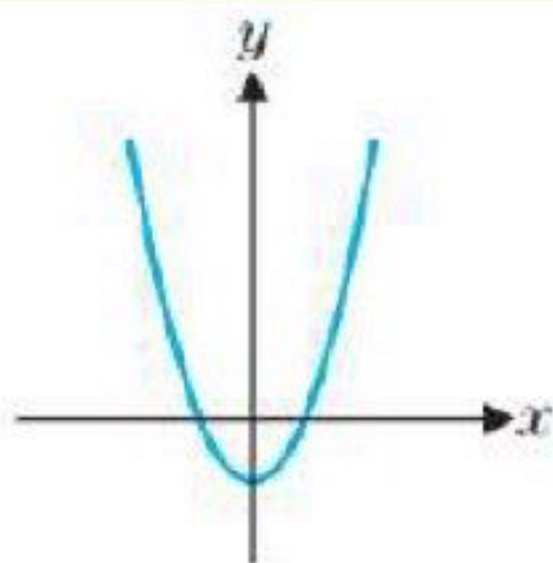
مثيل البياني لـ $y = f(x)$
، البياني $y = f'(x)$.



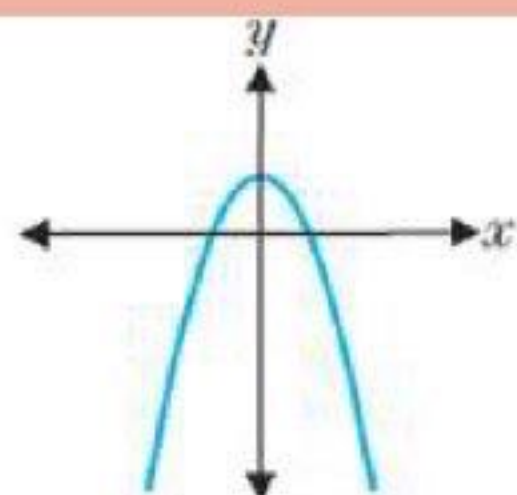
Learning Outcomes Covered

- MAT.6.02.04.002

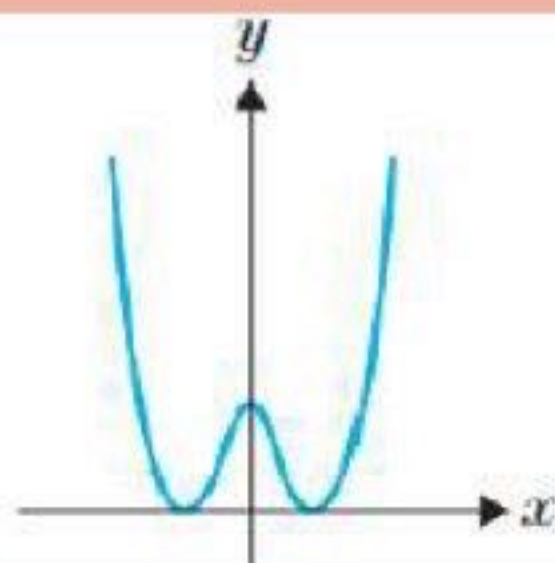
a.



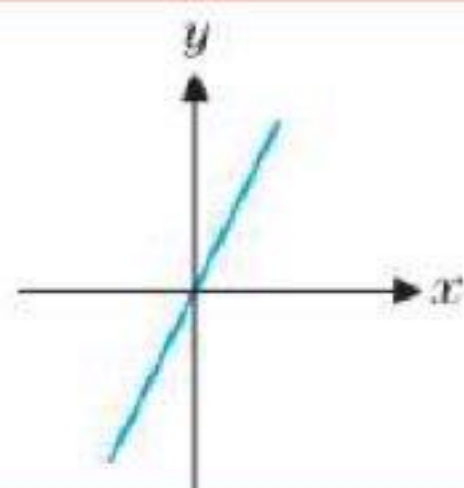
b.



c.



d.



Find implicitly $y'(x)$ for
 $x^2y - 3y^3 = x^2 + 1.$

y' ضمنيًا لـ
 $x^2y - 3y^3 =$

Learning Outcomes Covered

- MAT.6.02.07.001

a.

$$y'(x) = \frac{2x - 2xy}{x^2 + 9y^2}$$



b.

$$y'(x) = \frac{2x - 2xy}{x^2 - 9y^2}$$



c.

$$y'(x) = \frac{2x^2 + 2xy}{x^2 + y^2}$$



d.

$$y'(x) = \frac{2x - 2y}{x^2y + 9y^2}$$



Find a value of c as guaranteed by the Mean Value Theorem for the function $f(x) = x^2 - 2x$ on the interval $[0, 2]$.

c بالشكل الذي تحققه نظرية القيمة
للدالة $f(x) = x^2 - 2x$ في الفترة

Learning Outcomes Covered

○ MAT.6.02.09.002

a.

$$c = 2$$



b.

$$c = 0$$



c.

$$c = 1$$



d.

$$c = 1.5$$



Evaluate $\lim_{x \rightarrow 0} \sin\left(e^{-\frac{1}{x^2}}\right)$, if it exists.

، $\lim_{x \rightarrow 0} \sin\left(e^{-\frac{1}{x^2}}\right)$ ؛ إن وجدت.

Learning Outcomes Covered

- MAT.6.01.03.001

a.

0



b.

1



c.

-1



d.

غير موجودة

does not exist



Find the derivative of

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

$$f(x) = \sin^{-1}(\sqrt{x}).$$

Learning Outcomes Covered

- MAT.6.02.07.002

a.

$$f'(x) = \frac{1}{2\sqrt{x(1-x)}}$$



b.

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



c.

$$f'(x) = \frac{-1}{\sqrt{x(1-x)}}$$



d.

$$f'(x) = \frac{1}{\sqrt{\sqrt{x}(1-x)}}$$



Given that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$,

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

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

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

Learning Outcomes Covered

○ MAT.6.01.07.004

a.

1



b.

$-\frac{1}{2}$



c.

$\frac{1}{2}$



d.

2



Determine all horizontal asymptotes

طوط التقارب الأفقية لـ

of $f(x) = \frac{x}{\sqrt{x^2+1}}$.

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

Learning Outcomes Covered

○ MAT.6.01.03.002

a.

$y = -1$

☐

b.

$y = 0$

☐

c.

$y = 1$

☐

d.

$y = -1, y = 1$

☒

Find the derivative of the function

$$f(t) = 3t^{\pi} - 2t^{1.3}.$$

ثقة الدالة

$$f(t) = 3t^{\pi}.$$

Learning Outcomes Covered

○ MAT.6.02.05.002

a.

$$f'(t) = 3\pi - 2.6t$$



b.

$$f'(t) = 3\pi t - 2.6t$$



c.

$$f'(t) = 3\pi t^{\pi-1} - 2.6t^{0.3}$$



d.

$$f'(t) = 3\pi t^{\pi^2} - 2.6t^{0.3}$$



Evaluate $\lim_{x \rightarrow 0} x^2 \csc^2 x$, if it exists.

؛ $\lim_{x \rightarrow 0} x^2 \csc^2 x$ ، إن وجدت.

Learning Outcomes Covered

◦ MAT.6.01.07.004

a.

0



b.

1



c.

2



d.

غير موجودة

does not exist



Find the equation of the tangent line to the function $f(x) = \frac{2}{x+1}$ at $x = 1$.
لغة المماس للدالة $f(x) = \frac{2}{x+1}$ عند $x = 1$

Learning Outcomes Covered

○ MAT.6.02.02.002

a.

$$y = -\frac{1}{2}(x + 1) - 1$$



b.

$$y = -2(x - 1) + 1$$



c.

$$y = -\frac{1}{2}(x - 1) + 1$$

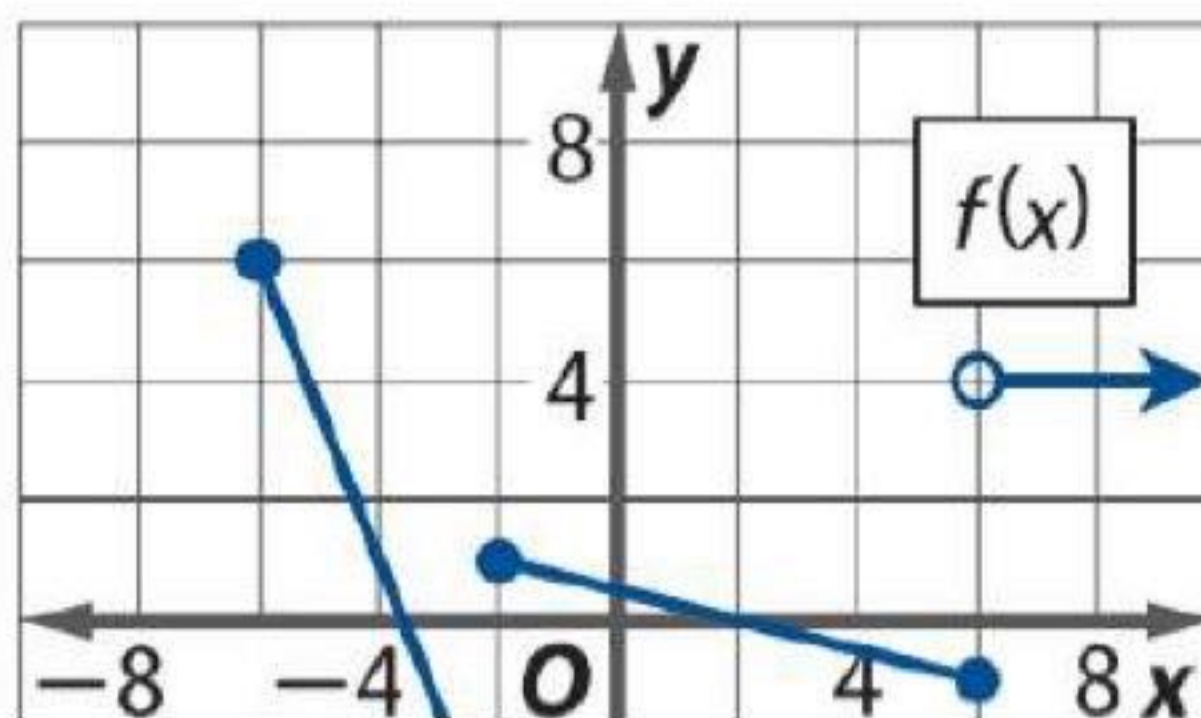


d.

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



Use the graph to determine $\lim_{x \rightarrow -2} f(x)$, $\text{ثيل البياني لتحديد } \lim_{x \rightarrow -2} f(x)$ if it exists.



Learning Outcomes Covered

○ MAT.6.01.07.001

a.

1

☐

b.

-4

☐

c.

0

☐

d.

غير موجودة

does not exist



ثقة الدالة

Find the derivative of the function

$$f(x) = \frac{\sqrt{\ln x}}{x}.$$

 $f(x)$

Learning Outcomes Covered

- MAT.6.02.06.004

a.

$$f'(x) = \frac{1 - 2 \ln x}{\sqrt{\ln x}}$$



b.

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



c.

$$f'(x) = \frac{1 - 2 \ln x}{2x^2 \sqrt{\ln x}}$$



d.

$$f'(x) = \frac{1 - 2 \ln x}{2x^2}$$



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

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

Learning Outcomes Covered

- MAT.6.04.02.002

a.

∞



b.

0



c.

1



d.

$\frac{1}{2}$



Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 + 2x - 3}$.

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

Learning Outcomes Covered

◦ MAT.6.01.07.004

a.

0



b.

$\frac{3}{4}$



c.

$\frac{1}{4}$



d.

$\frac{1}{2}$

