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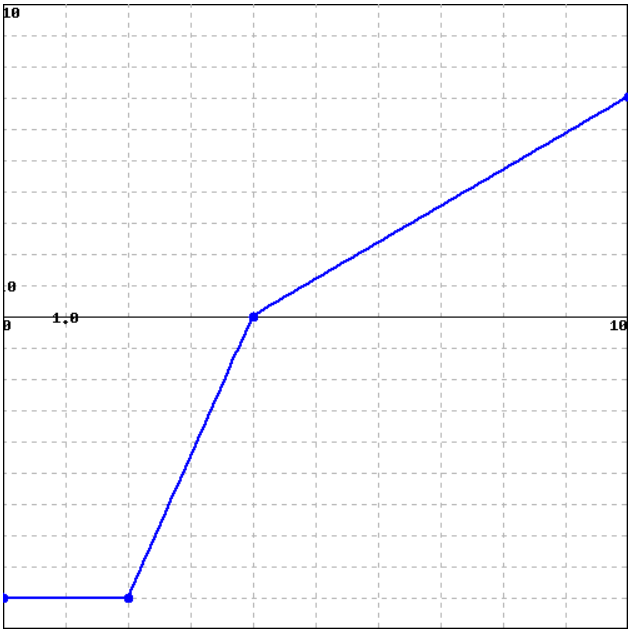
1. **(1 point)** Library/Valdosta/APEX_Calculus/5.2/APEX_5.2_6.pg



A graph of $f(x)$ is shown above. Using the geometry of the graph, evaluate the definite integrals.

a) $\int_0^2 f(x)\,dx =$ _____

b) $\int_2^4 f(x)\,dx =$ _____

c) $\int_0^4 f(x)\,dx =$ _____

d) $\int_4^{10} f(x)\,dx =$ _____

e) $\int_0^{10} -2f(x)\,dx =$ _____

Find two numbers whose sum in 12 so that the product $P = x^2y$ is a maximum.

- A. $x = 4$, $y = 8$
- B. $x = 10$, $y = 2$
- C. $x = y = 6$
- D. $x = 8$, $y = 4$
- E. None of the above

Given that $f'(x) = x^2(x+2)(x-2)(x-4)$, find the values of x that give the local maximum and local minimum values of the function $f(x)$. (Read the problem carefully. The given function is $f'(x)$, not $f(x)$.)

- A. Local maximum value of f at $x = 0$ and local minimum values of f at $x = -2, 4$.
- B. Local maximum values of f at $x = -2, 4$ and local minimum value of f at $x = 0$.
- C. Local maximum values of f at $x = -2, 2$ and local minimum values of f at $x = 0, 4$.
- D. Local maximum values of f at $x = 0, 4$ and local minimum values of f at $x = -2, 2$.
- E. Local maximum value of f at $x = 2$ and local minimum values of f at $x = -2, 4$.

Find the derivative of

$$f(x) = 2\sin^3(4x).$$

- A. $f'(x) = 6\cos^2(4x)$
- B. $f'(x) = 24\sin^2(4x)$
- C. $f'(x) = 6\sin^2(4x)\cos(4x)$
- D. $f'(x) = 24\sin^2(4x)\cos(4x)$
- E. $f'(x) = 8\cos^3(4x)$

Which of the following functions is NOT continuous at $x = 2$?

- A. $f(x) = \begin{cases} 3x+4 & \text{if } x < 2 \\ 3x^2 - \frac{2}{3}x - \frac{1}{2} & \text{if } x \geq 0 \end{cases}$
- B. $f(x) = \begin{cases} \frac{x^2-4}{x+2} & \text{if } x \neq -2 \\ -8 & \text{if } x = -2 \end{cases}$
- C. $f(x) = \begin{cases} 0 & \text{if } x \leq 0 \\ 1 & \text{if } x > 0 \end{cases}$
- D. $f(x) = \begin{cases} x^2 - 4 & \text{if } x < 2 \\ x^2 - 6x + 8 & \text{if } x \geq 2 \end{cases}$
- E. $f(x) = \begin{cases} \frac{x^2-4}{x-2} & \text{if } x \neq 2 \\ 4 & \text{if } x = 2 \end{cases}$

Find $\int_0^x \cos(t)\,dt$.

- A. $\cos(x) - 1$
- B. $\ln(x)$
- C. $\cos^2(x)$
- D. $\sqrt{1-x^2}$
- E. $\sin(x)$

Find $\lim_{x\to\infty} \dfrac{17x^5+2}{13x^5+9}$.

- A. 1
- B. $\frac{2}{9}$
- C. 0
- D. ∞
- E. $\frac{17}{13}$

Find the derivative $\dfrac{d}{dx}\left(\dfrac{e^x+7}{x^2+5}\right)$.

- A. $e^x(x^2-2x+5)+14x$
- B. $\dfrac{e^x+2x}{4x^2}$
- C. $\dfrac{e^x}{2x}$
- D. $\dfrac{e^x(x^2-2x+5)-14x}{(x^2+5)^2}$
- E. $\dfrac{e^x}{(x^2+5)^2}$

Find the derivative $\dfrac{d}{dx}x\sin(x)$.

- A. $\sin(x)+x\cos(x)$
- B. $\sec^(x)$
- C. $\sin(x)$
- D. $\dfrac{1}{2}x^2\cos(x)$
- E. $\cos(x)$

Calculate the derivative of y with respect to x for the equation

$$xe^y+x^2=y^2+7.$$

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- A. $\dfrac{e^y+2x}{2y-xe^y}$
- B. $\dfrac{e^x+x}{2x-e^y}$
- C. $\ln(y^2)+\sqrt{1-x^2}$
- D. $\dfrac{e^x+2y}{2x+ye^x}$
- E. $\dfrac{e^y-2y}{x+e^x}$

Find all of the critical numbers of $f(x) = x^3 - 12x - 880$ over its entire domain.

- A. $x = 10$
- B. $x = \pm 880$
- C. $x = \pm 2$
- D. $x = \pm 10$
- E. $x = 0$

Find

$$\lim_{x \to 0} \frac{\sin(11x)}{\sin(7x)}.$$

- A. $\frac{11\pi}{7}$
- B. $\frac{11}{7}$
- C. 0
- D. $\frac{\cos)11)}{\cos(7)}$
- E. $\frac{\pi}{6}$

Find the derivative

$$\frac{d}{dx} \int_0^x \arctan(7t)dt$$

- A. $\ln(\sec(7t))$
- B. $\frac{1}{1+49t^2}$
- C. $x\arctan(x) - \frac{1}{2}\ln(1+x^2)$
- D. $\arctan(7x)$
- E. $7\sec^2(7t)$

A particle moves in a straight line with velocity $9.8t$ m/s where t is time measured in seconds. Find the total displacement traveled over the time interval $[0, 10]$.

- A. 98 m
- B. 9.8 m
- C. 4.9 m
- D. 490 m
- E. 980 m

Find $\int x^2 e^{x^3}\, dx$.

- A. $2xe^{3x^2}+C$
- B. $(3x^4+2x)e^{x^3}+C$
- C. $\frac{1}{3}e^{x^3}+C$
- D. $\frac{1}{3}x^3e^{x^3}+C$
- E. $2xe^{x^3}+C$

Find the second degree Taylor polynomial $T_2(x)$ for the function $\dfrac{\sin x}{x}$ at the number $a=0$.

- A. $1-\frac{1}{6}x^2$
- B. $x-\frac{\pi}{4}x^2$
- C. $\pi+x-x^2$
- D. $x+\frac{1}{2}x^2$
- E. $1+x+\frac{1}{3}x^2$

17. **(1 point)** local/GlobalPandemic/Exam04_S21/Exam04_S21_Problem16.pg

Find the linear approximation to $24x^2+12x+12$.

$L(x) =$ _____

18. **(1 point)** local/GlobalPandemic/Exam04_S21/Exam04_S21_Problem17.pg

Find $\displaystyle\int_0^9 \left(2x+\frac{1}{2\sqrt{x}}\right) dx$.

Answer: _____

19. **(1 point)** local/GlobalPandemic/Exam04_S21/Exam04_S21_Problem18.pg

Find $\displaystyle\int_2^x \frac{3t^2}{2\sqrt{1+t^3}}$.

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20. **(1 point)** local/GlobalPandemic/Exam04_S21/Exam04_S21_Problem20.pg

The general antiderivative of $f(x)=e^{2x}+x\sin(8x^2)$ is

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