

- If $f(x)$ is continuous on $[a, b]$ which is true?
 - $f'(x)$ exists on (a, b)
 - If $f(x_0)$ is a local max of f on (a, b) then $f'(x_0) = 0$
 - $\lim_{x \rightarrow c} f(x) = f(c)$
 - $f'(x) = 0$ for some x in (a, b)
 - The graph of $f(x)$ is linear
- Find the area bounded by $y = e^{4x}$, $y = 0$, $x = 0$ and $x = \ln(3)$.
- Use implicit differentiation to find y' if $y = \ln(x^2 + y^2)$ at $(1, 0)$.
- Use differentials to estimate $(8.06)^{2/3}$
- Find the volume of the solid that has the area bounded by $y = x^2$, $y = 9$ as its base and cross-sections perpendicular to the x -axis are rectangles of height 2.
- Find the differential dy if $y = x\sqrt{1+x^2}$, $x = 0$ and $dx = 2$.
- Find the arc length of $y = \frac{x^3}{6} + \frac{1}{2x}$ for $\frac{1}{2} \leq x \leq 2$.
- For what values of k will $y = \frac{k}{x} + x$ have a local max at $x = -2$?
 - 4
 - 2
 - 2
 - 4
 - none of these
- Find $\frac{d}{dx} (x^{\ln(x)})$
- Express as a definite integral: $\lim_{n \rightarrow \infty} \sum_{i=1}^n (3x_i^2 - 6x_i) \Delta x$ on $[0, 5]$
- A 13 *ft* ladder leaning against a wall has the top sliding down at a rate of $3 \frac{ft}{sec}$. When the top of the ladder is 5 *ft* from the ground, at what rate is the bottom sliding out?
- Find the critical numbers of $y = \ln |x^2 - 1|$
- The top and bottom margins of a poster are 6 *cm* and the side margins are each 4 *cm*. If the area of the printed material is fixed at 384 *cm*², find the dimensions of the poster with the smallest area.
- A 10 *ft* board is sliding down a vertical wall. When its angle with the horizontal is $\frac{\pi}{6}$ and the base is moving away from the wall at $\frac{1}{7} \frac{ft}{sec}$, what is the rate of change of the angle?

15. Find $\lim_{x \rightarrow -1^-} \frac{|x+1|}{x+1}$
16. Find the volume if the base of a solid has the area bounded by $y = \sqrt{x}$, $x = 5$, $y = 0$ and cross sections are perpendicular to the y -axis are squares. **Set up the integral only.**
17. Find: $\int t \sec^2(t^2) dt$
18. Find: $\int \frac{\csc^2(\sqrt{x})}{\sqrt{x}} dx$
19. Find: $\int \sin^5(3z) \cos(3z) dz$
20. Find $s(t)$ if $a(t) = \sin(t)$, $v(0) = 0$ and $s(0) = 0$.

Answers

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| 1) C | 11) $\frac{5}{4}$ |
| 2) 20 | 12) 0 |
| 3) $y' = 2$ | 13) 24×36 |
| 4) 4.02 | 14) $-\frac{1}{35}$ |
| 5) 72 | 15) -1 |
| 6) 2 | 16) $\int_0^{\sqrt{5}} (5 - y^2)^2 dy$ |
| 7) $\frac{33}{16}$ | 17) $\frac{1}{2} \tan(t^2) + C$ |
| 8) D | 18) $-2 \cot(\sqrt{x}) + C$ |
| 9) $y' = x^{\ln(x)} \left(\frac{2 \ln(x)}{x} \right)$ | 19) $\frac{1}{18} (\sin(3z))^6 + C$ |
| 10) $\int_0^5 (3x^2 - 6x) dx$ | 20) $s(t) = -\sin(t) + t$ |