

MCV4U - W14: Some Practice Multiple Choice Questions

Answers to the following questions will be posted by Tuesday April 15. DO NOT WAIT FOR THE ANSWERS. TRY THE PROBLEMS YOURSELVES.

Please note that these questions, along with the practice problems, do not represent all that you need to know for the exam. Study your notes. Anything discussed in class is fair game for the exam. (note that I haven't asked very much about continuity in the practice problems...just saying.) However, the two practice problem sets do represent a fair idea of what to expect on the exam. Happy studying!

- Find $\lim_{x \rightarrow -3^-} \frac{1}{x+3}$.
A. 0 B. ∞ C. $-\infty$ D. $\frac{1}{6}$
- For the function $y = \frac{2}{x}$, which of the following is equivalent to the quotient $\frac{f(x+h) - f(x)}{h}$?
A. $-\frac{2}{x^2}$ B. $-\frac{x^2}{x(x+h)}$ C. $-\frac{h}{x(x+h)}$ D. $-\frac{2}{x(x+h)}$
- If $f(x) = \frac{u}{v}$, what is the derivative of $f(x)$?
A. $f'(x) = \frac{u'v + uv'}{v}$ B. $f'(x) = \frac{u'v - uv'}{v}$ C. $f'(x) = \frac{u'v + uv'}{v^2}$ D. $f'(x) = \frac{u'v - uv'}{v^2}$
- Differentiate $f(x) = (4x + 5)^3$.
A. $(4x + 5)^2$ B. $12(4x + 5)^2$ C. $3(4x + 5)^2$ D. $12(4x + 5)^3$
- What is the derivative of the function $f(x) = e^{2x} - e^{-2x}$?
A. $f'(x) = 2e^{2x} - 2e^{-2x}$ B. $f'(x) = e^{2x} - e^{-2x}$ C. $f'(x) = e^{2x} + e^{-2x}$ D. $f'(x) = 2e^{2x} + 2e^{-2x}$
- If f is a differentiable function, then the expression for the derivative of $h(x) = x^2f(x)$ is:
A. $h'(x) = x^2f'(x) + f(x)x^2$ B. $h'(x) = 2xf'(x) + x^2f(x)$ C. $h'(x) = 2xf(x) + f'(x)x^2$
D. $h'(x) = 2xf(x) - f'(x)x^2$
- Where is $f(x) = \frac{x}{x^2 + 1}$ not differentiable?
A. $f(x)$ is not differentiable at $x = -1$ B. $f(x)$ is not differentiable at $x = 0$ C. $f(x)$ is not differentiable at $x = 1$ D. $f(x)$ is differentiable for all $x \in \mathbb{R}$
- The slope of the tangent to the curve $y = e^{3x}$ at $x = 1$ is:
A. $\frac{3}{e^3}$ B. e^3 C. $3e^3$ D. $3e^2$

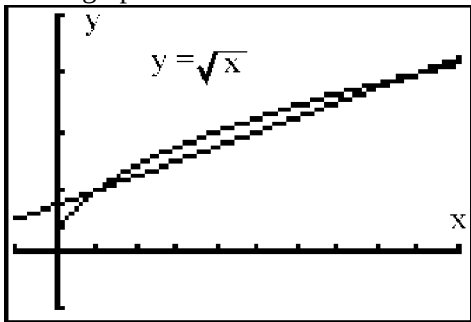
9. For $f(x) = 7x^3 - 3x^2 + 9x - 11$, evaluate $f''\left(\frac{2}{3}\right)$.

- A. $\frac{43}{3}$ B. 22 C. -11 D. $\frac{2}{3}$

10. If $f(x) = e^{-x^{-1}}$, calculate $f'(2)$.

- A. $f'(2) = \frac{1}{4\sqrt{e}}$ B. $f'(2) = -\frac{1}{2}\sqrt{e}$ C. $f'(2) = -\frac{1}{4}e^{\frac{1}{4}}$ D. $f'(2) = e^{\frac{1}{4}}$

11. For the function $f(x) = \sqrt{x}$ determine the slope of the secant line that is shown in the graph through the points on the graph where $x = 9$ and $x = 1$.



- A. $\frac{1}{4}$ C. -3
B. $-\frac{1}{2}$ D. 4

12. The equation of the tangent to the graph of $y = 3x^2 + 9x + 5$ at the point $(-1, -1)$ is:

- A. $3x - 3y + 4 = 0$ B. $3x - y + 2 = 0$ C. $x + y = 4$ D. $x - 3y + 4 = 0$

13. Classify the critical number of the function $y = 6x^2 - 12x + 8$.

- A. maximum B. minimum C. point of inflection D. none of the above

14. Let $f(x) = \frac{x+1}{(x-1)^2}$. Determine any critical values.

- A. $x = -3$ B. $x = -3, x = 1$ C. $|x| < 1$ D. $x = 3, x = -1$

15. On what interval is $f(x) = \frac{3}{x^2 + 8x + 15}$ decreasing?

- A. $-5 < x < -3$ B. $x < -4$ C. $-4 < x < -3$ and $x > -3$ D. $x < -5$ and $x > -3$

16. The position of a particle is given by $s(t) = t^2 - 4t + 4$, $t \geq 0$, where s is measured in metres and t in seconds. Find all values of t for which the particle moves in the positive direction.

- A. $t > -2$ B. $t < 2$ C. $t > 2$ D. $0 < t < 2$

17. A home daycare provider needs to fence off a rectangular area in her backyard for the children to safely play. She needs to fence off 100 m^2 to allow enough room for play equipment. The back of her home is 8 m wide and she uses the back of her home as part of one of the sides of the fence. Find the dimensions that minimize the cost of the fencing.
A. 20 m by 5 m B. 8 m by 12.5 m C. 10 m by 10 m D. 16 m by 6.25 m
18. The profit model of a car company is modelled by $P(x) = -5.5x^2 + 6600x + 2000$. The marginal profit on the sale of 500 cars is:
A. \$2000 B. \$1100 C. \$6600 D. \$2750
19. A certain radioactive substance is decaying so that at time t , measured in years, the amount of the substance, in grams, is given by the function $f(t) = -e^t + 10$. What is the rate of decay of the substance after 1 year?
A. -3 g/year B. $-\ln 2 \text{ g/year}$ C. -2.72 g/year D. -1.53 g/year
20. Which of the following is the maximum value of the function $f(x) = 2 \sin x \cos x$?
A. 0 B. 1 C. 2 D. There does not exist a maximum value.