Calculus Review   1st Semester Final Exam

Show All Work on Lined Paper

Since Part I of the test is 28 questions – No Calculator
and Part II of the test is 17 questions – Calculator
This Review has both Non-Calculator and Calculator questions

#1 - #5 on this Review is Non-Calculator
#6-#10 on this Review is Calculator
#11-#15 on this Review is Non-Calculator
#16-#20 on this Review is Calculator

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1. Find equation of the tangent line to the graph $f(x) = x(4-3x)^2$ at $x = 2$

2. $f(x) = \sqrt{4x}$ Find $f'(5)$

3. When is f concave up? $f(x) = \frac{1}{12}x^4 + \frac{1}{2}x^3 - 2x^2 + 5$

4. Find dy/dx at $(1, -1)$ $2x - 3xy - y^3 = 6$

5. $\int_1^3 |x-2|\, dx$

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6. Find Area of the region enclosed by $y = \frac{1}{2}x$. Use Right Reimann Sum.
    $x = 0$ to $x = 4$.   4 Sub-divisions

7. How many zeros does $f'(x)$ have? $f(x) = x \cos(x)$ On the interval $[-2\pi, 2\pi]$

8. Does the graph of $y = \dfrac{-2x}{1 - 2x}$ have $y = -1$ as an asymptote?

9. Sketch $\dfrac{(x-2)^3}{x^2}$. Then, Find $f'(x.1)$

10. Find Average Value of $f(x) = \sqrt{x-1}$ on interval $[3.5, 5.2]$

11. At what values of x does f have a relative maximum? $f(x) = \frac{1}{5}x^5 - \frac{13}{3}x^3 + 36x$

12. Let f be function $f(x) = 4x^3$. What are the values of c that satisfy the conclusion of Mean Value Theorem on interval $[-1, 2]$

13. Find dy/dx $\qquad f(x) = \dfrac{x^2 - 3}{4x + 5}$

14. In which interval is $f(x)$ decreasing? $f(x) = \frac{1}{3}x^3 - \frac{3}{2}x^2 - 4x + 6$

15. $\displaystyle\int_0^1 (3x - 1)^4 \, dx$

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16. What is Area of largest rectangle with lower base on x-axis and upper vertices on curve

$Y = 4 - x^2$

17. $f(x) = (\cos(2x))(x + 4)^2$ $\qquad$ Find $f'(0)$

18. Find the shortest distance from curve $xy = 6$ to the origin

19. $\displaystyle\int_1^4 x(2x - 6)^3 \, dx$

20. $f(x) = x^4 - 5x^3$
$g(x) = 6x^3 + 2x$

$h(x) = f(g(x))$ $\qquad$ Find $h'(1.3)$