MAC2311 Ref. #:<u>829232</u> Term: Spring 2015 (2014_2) Exam #3

Name

Grade

Student ID_____

Date_____

SHORT ANSWER. Show ALL work NEATLY in the space provided, and write the final answer on the answer line. No credit will be given if work is not shown or is not legible.

Find the second derivative.

1)
$$y = 3x^3 - 5x^2 + 8$$

Find the derivative of y with respect to the independent variable.

2) $y = 5^{x}$



Solve the problem.

3) Find the points where the graph of the function have horizontal tangents.

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 $f(x) = x^3 - 12x$

Find the derivative of the function.

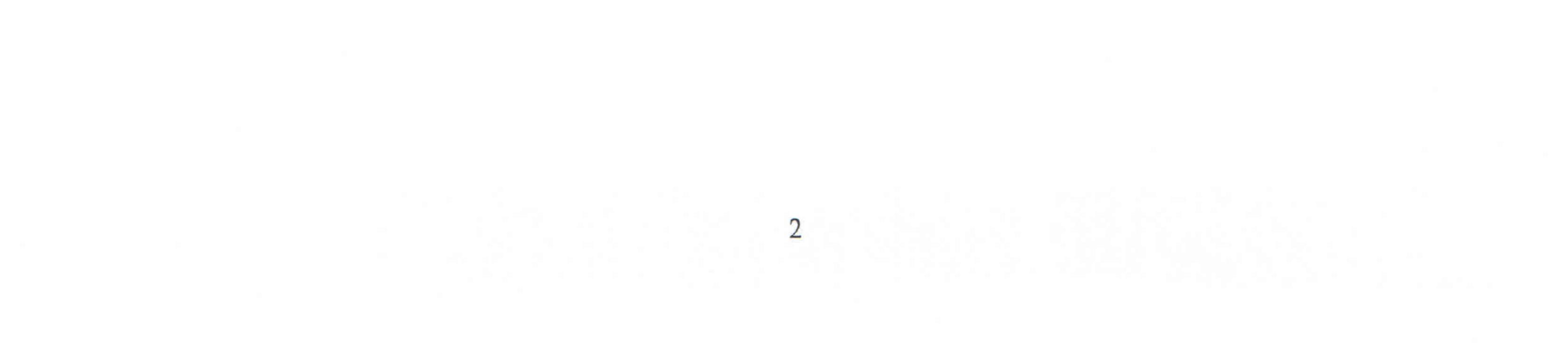
4)
$$s = sin\left(\frac{9\pi t}{2}\right) - cos\left(\frac{9\pi t}{2}\right)$$

Find y'. 5) $y = sin(3x^2e^x)$

5)

3)

4)



Use implicit differentiation to find dy/dx. 6) $2xy - y^2 = 1$

Find the value of df^{-1}/dx at x = f(a). 7) f(x) = 4x + 9, a = -1

Use a reference triangle in an appropriate quadrant to find the angle. 8) \tan^{-1} (1)



6)

8)

Find the derivative of y with respect to x.

9)
$$y = \cos^{-1} (3x^2 - 2)$$

Use a reference triangle in an appropriate quadrant to find the angle. 10) $\sin^{-1} \frac{\sqrt{3}}{2}$

10)

11)

9)

Find the derivative of y with respect to x, t, or θ , as appropriate. 11) y = ln(cos(ln θ))



Solve the problem. Round your answer, if appropriate.

12) The volume of a sphere is increasing at a rate of 7 cm³/sec. Find the rate of change of its surface area when its volume is $\frac{4\pi}{3}$ cm³. (Do not round your answer.)

12)

Find the derivative of y with respect to the independent variable. 13) $y = \log_{14}e^{x} - \log_{5}\sqrt{x}$

13)

Use logarithmic differentiation to find the derivative of y. 14) y = x(x - 8)(x + 5)

14) _____

5

Find the derivative of y with respect to the independent variable. 15) $y = 10^{\cos \pi \theta}$



16)

Use logarithmic differentiation to find the derivative of y with respect to the independent variable. 16) $y = (x + 3)^{X}$

Find the derivative of y with respect to the independent variable. 17) $y = 7^{\ln 9t}$

17)



At the given point, find the slope of the curve, the line that is tangent to the curve, or the line that is normal to the curve, as requested.

18) $y^2 + x^2 = y + 2x$, tangent at (0, 1)

18) _____

Find $\frac{dy}{dx}$, using logarithmic differentiation. 19) sin y = 5x + 5y

19)

Find the derivative of y with respect to the independent variable. 20) $y = \log_4 t + \log_4 t^2$

20) _____



Use logarithmic differentiation to find the derivative of y with respect to the independent variable (5 points Extra Credit). $21) y = x^{8 \sin x}$ 21)



Answer Key Testname: MAC2311 - EXAM #3

1) 18x - 102) $5^{x} \ln 5$ 3) $(-\sqrt{7}, 14\sqrt{7}), (\sqrt{7}, -14\sqrt{7})$ 4) $\frac{9\pi}{2} \cos\left(\frac{9\pi t}{2}\right) + \frac{9\pi}{2} \sin\left(\frac{9\pi t}{2}\right)$ 5) $3(x^{2} + 4x + 2)e^{x} \cos(3x^{2}e^{x}) - 9xe^{2x}(x^{3} + 4x^{2} + 4x) \sin(3x^{2}e^{x})$ 6) $\frac{y}{y - x}$

