

University of Lethbridge
Department of Mathematics and Computer Science
17 October, 2017
MATH 1560 - Test #3 – Group Stage
Examiner: Sean Fitzpatrick

Record the names of your group members below. Groups must contain between 3 and 5 members.

Please print clearly.

- | | |
|---------------------|-------------------|
| 1. Last Name: _____ | First Name: _____ |
| 2. Last Name: _____ | First Name: _____ |
| 3. Last Name: _____ | First Name: _____ |
| 4. Last Name: _____ | First Name: _____ |
| 5. Last Name: _____ | First Name: _____ |

Print your name and student number clearly in the space above. You may remove this cover page, and use the back for scrap paper. If you want any work on the back of this page to be graded, you must clearly indicate this on the page containing the corresponding question.

Answer the questions in the space provided. Show all work and necessary justification. Partial credit may be awarded for partially correct work.

No outside aids are permitted, with the exception of a basic calculator.

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[2] 1. Calculate the derivative of $f(x) = \arctan(x^2)$.

[4] 2. Calculate the derivative of $f(x) = \sqrt{\frac{x^3 e^x}{x^6 + 2x^2}}$.
Suggestion: use logarithmic differentiation.

[4] 3. Use implicit differentiation to compute $\frac{dy}{dx}$ (in other words, y') if
$$x^4 + x^2 y^2 = 3y.$$

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[4]

4. Determine the absolute (global) maximum and minimum values of $f(x) = x^2 + \frac{1}{x}$ on the interval $[\frac{1}{10}, 2]$.

[4]

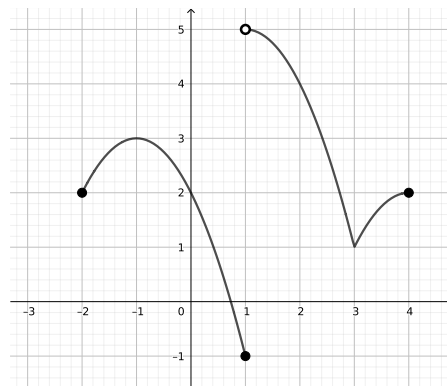
5. This question refers to the graph of a function f shown below on the right. For each value requested below, either enter the value, or DNE, if the value is undefined. You do not have to explain your answer.

(a) What is the absolute maximum of f ?
(Give both x and y coordinates)

(b) What is the absolute minimum of f ?
(Give both x and y coordinates)

(c) At what x coordinate(s) is $f'(x) = 0$?

(d) At what x coordinate(s) does $f'(x)$ not exist?



[2] 6. (Extra group question!)

The curve shown to the right is called the **Tschirnhausen Cubic**, and is given by the equation

$$y^2 = x^3 + 3x^2.$$

From the graph, we can see that the curve has two horizontal tangents, and one vertical tangent. Determine the points at which they occur.

