University of Lethbridge
Department of Mathematics and Computer Science

MATH 1565 - Tutorial #9

Print your name and student number clearly in the space above.

Complete the problems on the back of this page to the best of your ability. If there is a problem you especially desire feedback on, please indicate this.

It is recommended that you work out the details on scrap paper before writing your solutions on this page.

1. Consider the function $f(x) = x^4 \ln(x)$.

[1] (a) State the domain of f

(b) Determine any x-intercepts. (If you answered (a) correctly, you'll know why I didn't ask
[1] for a y-intercept).

[3] (c) Determine $\lim_{x \to 0^+} f(x)$. (Use l'Hospital's Rule.)

[2] (d) Compute $f'(x)$.

[2] (e) Construct a sign diagram for f'. On what intervals is f increasing/decreasing?

[1] (f) Classify any critical numbers found in part (e) as local maxima, minima, or neither.

[2] (g) Compute $f''(x)$.

(h) Construct a sign diagram for f''. On what intervals is the graph of f concave up/down?
[2]

[1] (i) Determine any inflection points on the graph of f.

(j) Sketch the graph of f. Your graph should reflect your results in parts (a) - (i) above.
[3] Label any intercepts, critical points, and inflection points.