

MATH 3315 - EXAM 1 - FALL 2017

Name: _____

Friday 8 September 2017

Instructor: Tom Cuchta

Instructions:

- Show all work, clearly and in order, if you want to get full credit. If you claim something is true **you must show work backing up your claim**. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Justify your answers algebraically whenever possible to ensure full credit.
- Circle or otherwise indicate your final answers.
- Please keep your written answers brief; be clear and to the point.
- Good luck!

1. (36 points) Compute the following derivatives.

(a) (6 points) $\frac{d}{dx} \log(5x^2 + 3x + 1)$.

(b) (6 points) $\frac{d}{dx} (e^{5x} + e^{7x} + 1)^3$

(c) (6 points) $\frac{d}{dt} \arcsin(7t^3 - 9)$

(d) (6 points) $\frac{d}{dz} 3^{5z-1}$

(e) (6 points) $\frac{d}{dt} \frac{\cosh(t)}{\sinh(t) + 1}$

(f) (6 points) $\frac{d}{dw} \log(\log(\log(w)))$

2. (36 points) Compute the following indefinite integrals.

(a) (6 points) $\int \frac{1}{2+x^2} dx$

(b) (6 points) $\int \frac{w-5}{w^2+1} dw$

(c) (6 points) $\int \frac{4v+4}{2v^2+4v+18} dv$

(d) (6 points) $\int \coth(\theta) d\theta$ (recall: $\coth = \frac{\cosh}{\sinh}$)

(e) (6 points) $\int \frac{\cosh(t)}{\sinh(t)+1} dt$

(f) (6 points) $\int \frac{17}{\sqrt{1-2w^2}} dw$

3. (28 points) Compute the following definite integrals.

(a) (7 points) $\int_0^1 7^x - 11^x dx$

(b) (7 points) $\int_2^3 \frac{1}{\sqrt{16y^2 + 1}} dy$

(c) (7 points) $\int_0^3 \xi^4 + 3\xi^2 + \xi + 1 d\xi$

(d) (7 points) $\int_1^2 \frac{1}{57 - 4z^2} dz$