

Credit will be given for work shown. Attach solutions on a separate sheet of paper.

Due Tuesday, Jan. 19 in class.

1. [1.5 pts] Evaluate the indefinite integral $\int (t + 1) \sin(t) dt$

2. [1 pts] Evaluate the definite integral $\int_0^2 \frac{y}{(y^2 + 4)^{\frac{3}{2}}} dy$

3. A parametric curve is defined by $\mathbf{c}(t) = (x(t), y(t)) = (3 \cos(t) + 3, 3 \sin(t))$.

Hint: It may be helpful to review §11.1 for curve sketching and parametric equations of a line, and §11.2 for speed and arc length.

(a) [1 pt] Sketch the curve $\mathbf{c}(t)$ for $0 \leq t \leq 2\pi$.

(b) [0.5 pt] Find the slope of the tangent line to $\mathbf{c}(t)$ at $t = \frac{\pi}{3}$.

(c) [1 pt] Find the **parametric** equation for the tangent line to $\mathbf{c}(t)$ at $t = \frac{\pi}{3}$.

(d) [1 pt] Find the speed $\frac{ds}{dt}$ at $t = \frac{\pi}{3}$.

(e) [1 pt] Find the arc length of the curve $\mathbf{c}(t)$ for $0 \leq t \leq \frac{\pi}{3}$.

4. (a) [1 pt] Convert the equation $(x - 2)^2 + y^2 = 4$ into polar coordinates and write it in the form $r = f(\theta)$ (i.e. solve the converted equation for r).

(b) [1 pt] Sketch the region between the equation in part (4a) and the curve $r = 1$ with $0 \leq \theta \leq \frac{\pi}{2}$.

By signing this statement, I acknowledge that make-up examinations will only be given if I am officially representing MSU in an athletic event, government, performance or similar official capacity, if I have a legal obligation or if I have sustained a personal emergency that prevents participation in the scheduled examination. If possible, I will alert my instructor about any such absences at least 10 days in advance of the examination.

Make-up examinations will not be scheduled for vacations, work or other personal considerations. If I miss an exam due to a personal emergency, it is my responsibility to contact my instructor as soon as possible, preferably before or on the exam date. I am aware of the dates of all four exams (2/9, 3/8, 4/5 in class, and the final on 5/6 from 10-11:50) and I have verified that I will not be absent for any reason other than those outlined above.

If I am taking exams through Accommodation Services and the Testing Center, I will discuss this with my instructor well in advance of the first examination. (Note: This does not preclude a student from signing up for testing accommodation later in the semester.)

Name: _____ Date: _____

Signature: _____