MA 126 — Spring 2017 — Prof. Clontz — Mini Assessment

Name: _____

- Each question is prefaced with a Standard for this course.
- When grading, each response will be marked as follows:
  - ✓: The response is demonstrates complete understanding of the Standard.
  - ⋆: The response may indicate full understanding of the Standard, but clarification or minor corrections are required.
  - ×: The response does not demonstrate complete understanding of the Standard.
- Only responses marked with a ✓ mark count toward your grade for the semester. Visit the course website for more information on how to improve ⋆ and × marks.
- This Assessment is due after 50 minutes. All blank responses will be marked with ×.

C07: This student is able to... Use the washer or cylindrical shell method to express a volume of revolution as a definite integral.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Find a definite integral equal to the volume of the solid of revolution obtained by rotating the triangle with vertices $(2, 2)$, $4, 2$, $(2, 4)$ around the axis $x = 0$. (Do not solve your integral.)

C08: This student is able to... Express the work done in a system as a definite integral.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Hooke's Law states that the force required to compress a spring x units from its natural length requires $F(x) = kx$ units of force for some constant k (depending on the spring). Suppose a spring satisfies $k = 6$ and is naturally length 11. Find a definite integral equal to the work required to compress this spring from length 8 to length 4. (Do not solve your integral.)

C09: This student is able to... Parametrize a curve to express an arclength or area as a definite integral.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Recall the following. A smooth curve parametrized by one-to-one functions $x(t), y(t)$ on $a \leq t \leq b$ where $y(t) \geq 0$ may be rotated around the x-axis to yield a surface of revolution. Its area is given by $2\pi \int_a^b y(t)\sqrt{(\frac{dx}{dt})^2 + (\frac{dy}{dt})^2}\, dt$.
Use this to find a definite integral equal to the conical surface area obtained by rotating the line segment connecting $(0, 0)$ and $(3, 6)$ around the axis $y = 0$.
(Do not solve your integral.)

C10: This student is able to... Use polar coordinates to express an arclength or area as a definite integral.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Find a definite integral equal to the arclength of $r = 3\cos\theta$ between $-\pi/4$ and $\pi/4$. (Do not solve your integral.)

C11: This student is able to... Compute the limit of a convergent sequence.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Find $\lim_{k\to\infty} \dfrac{e^{2k+7}}{4-e^k}$.

C12: This student is able to... Express as a limit and find the value of a convergent geometric or telescoping series.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Find the value of the convergent series $\sum_{k=3}^{\infty}(\frac{k+3}{3k} - \frac{k+4}{3k+3})$.

S09: This student is able to... Use parametric equations to find and use tangent slopes.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Find the point on the parametric curve defined by $x = t^2 + 1$, $y = t^3/3$ for all positive numbers $t > 0$ that has a tangent slope of 2.

S10: This student is able to... Convert and sketch polar and Cartesian coordinates and equations.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

a) Find a Cartesian coordinate equal to the polar coordinate $p(4, 2\pi/3)$.

b) Sketch the polar curve $r = 4\sin\theta$ for $0 \leq \theta \leq \pi$ in the xy plane.

S11: This student is able to... Define and use explicit and recursive formulas for sequences.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Give an explicit or recursive formula matching the sequence $\langle b_n \rangle_{n=0}^{\infty} = \langle 3, 8, 13, 18, 23, 28, 33, 38, \ldots \rangle$.

S12: This student is able to... Use the alternating series test to determine series convergence.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Does $\sum_{m=1}^{\infty}(-1)^{m+1}\frac{e^m}{1+e^{2m}}$ converge or diverge?

S13: This student is able to... Use the integral test to determine series convergence.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

a) Does $\int_0^\infty \frac{2x}{1+x^2}\,dx$ converge or diverge?

b) Based on (a), does $\sum_{n=0}^{\infty} \frac{2n}{1+n^2}$ converge or diverge?

S14: This student is able to... Use the ratio and root tests to determine series convergence.	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

Does $\sum_{k=3}^{\infty} \frac{k^3+7k+3}{2^k}$ converge or diverge?

Other: This student is able to... Fill in here:	Mark: (Instructor Use Only)	Reattempt/ Correction: (Instructor Use Only)

(Put question here.)

Use this space if you need extra room for a problem: