

Name: _____

- Each question is prefaced with a Standard for this course.
- When grading, each response will be marked as follows:
 - ✓: The response 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 ×.

Standard Assessment 6

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)
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Find a definite integral equal to the volume of the solid of revolution obtained by rotating the region bounded by $y = |x| + 1$ and $y = 2$ around the axis $y = 0$. (Do not solve your integral.)

Standard Assessment 6

<p>C08: This student is able to...</p> <p>Express the work done in a system as a definite integral.</p>	<p>Mark:</p> <p>(Instructor Use Only)</p>	<p>Reattempt/ Correction:</p> <p>(Instructor Use Only)</p>
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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 $k = 8$ and is naturally length 9. Find a definite integral equal to the work required to compress this spring from length 7 to length 5. (Do not solve your integral.)

Standard Assessment 6

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)
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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 $2\pi \int_a^b y(t) \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt$.

Use this to find a definite integral equal to the surface area of a sphere of radius 2.

(Hint: Rotate a semicircle of radius 2.) (Do not solve your integral.)

Standard Assessment 6

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)
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Find a definite integral equal to half of the circumference of the cardioid $r = 3 + 3 \sin t$. (Do not solve your integral.)

Standard Assessment 6

<p>C11: This student is able to...</p> <p>Compute the limit of a convergent sequence.</p>	<p>Mark:</p> <p>(Instructor Use Only)</p>	<p>Reattempt/ Correction:</p> <p>(Instructor Use Only)</p>
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Find $\lim_{k \rightarrow \infty} \frac{\ln(k^2) + e}{\ln(k)}$.

Standard Assessment 6

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

Find the value of the convergent series $\sum_{k=2}^{\infty} \left(\frac{1}{2k} - \frac{1}{2k+2} \right)$.

Standard Assessment 6

<p>S09: This student is able to... Use parametric equations to find and use tangent slopes.</p>	<p>Mark:</p> <p>(Instructor Use Only)</p>	<p>Reattempt/ Correction:</p> <p>(Instructor Use Only)</p>
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Find the point on the parametric curve defined by $x = t^2 + 3$, $y = 4t$ for all real numbers t that has a tangent slope of 1.

Standard Assessment 6

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

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

- b) Sketch the polar curve $r = \frac{1}{\cos \theta + \sin \theta}$ for $-\frac{\pi}{4} < \theta < \frac{3\pi}{4}$ in the xy plane.

Standard Assessment 6

<p>S11: This student is able to... Define and use explicit and recursive formulas for sequences.</p>	<p>Mark:</p> <p>(Instructor Use Only)</p>	<p>Reattempt/ Correction:</p> <p>(Instructor Use Only)</p>
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Give an explicit or recursive formula matching the sequence $\langle b_n \rangle_{n=0}^{\infty} = \langle 1, 2, 5, 10, 17, 26, 37, \dots \rangle$.

Standard Assessment 6

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

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

Standard Assessment 6

<p>S13: This student is able to...</p> <p>Use the integral test to determine series convergence.</p>	<p>Mark:</p> <p>(Instructor Use Only)</p>	<p>Reattempt/ Correction:</p> <p>(Instructor Use Only)</p>
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a) Does $\int_0^\infty \frac{2e^x}{1+e^{2x}} dx$ converge or diverge?
 (Hint: $\frac{d}{dx}[\tan^{-1}(x)] = \frac{1}{1+x^2}$ and $\lim_{x \rightarrow \infty} \tan^{-1}(x) = \pi/2$.)

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

Standard Assessment 6

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

Does $\sum_{k=3}^{\infty} \left(\frac{k-3}{k}\right)^{k^2}$ converge or diverge?
(Hint: $\lim_{n \rightarrow \infty} \left(1 + \frac{x}{n}\right)^n = e^x$.)

Standard Assessment 6

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