Test Total

Name _____

Final Exam Calculus II Dr. Kreider
Fall 2016 For full credit, show your work and use correct notation

1. Let R be the region enclosed by the curves $y = \sqrt{x}$, $y = 0$ and $x = 1$. Let S be the solid obtained by rotating R about the line $x = -1$.
(a) Set up but do not evaluate the integral for the volume of S using the washer method.

(b) Set up but do not evaluate the integral for the volume of S using the shell method.

Pg 1: 10 pts

2. Find the area of the region between the curves $y = x^2 - 2$ and $y = 6 - x^2$.

2: 10 pts

3. Evaluate $I = \int z^3 \ln z \, dz$

3: 10 pts

Pg 2: 20 pts

4. Evaluate $I = \int \sin^3 x \cos^6 x \, dx$

4: 10 pts

5. Determine whether the improper integral $I = \int_1^6 \frac{7}{(x-1)^4} \, dx$ converges or diverges. If it converges, find its value.

5: 10 pts

Pg 3: 20 pts

6. Evaluate $I = \int \frac{t^5}{\sqrt{t^2+16}}\, dt$

6: 10 pts

7. Find the arc length of the curve $y = 1 + 2x^{3/2}$ for $1 \leq x \leq 3$.

7: 10 pts

Pg 4: 20 pts

8. Evaluate $I = \int \dfrac{3x-2}{x^2+12x+37}\,dx$

7: 10 pts

9. Consider the parametric curve $x = \sin 2t$, $y = -\cos 2t$ for $-\pi/4 \le t \le \pi/4$.
(a) Find the Cartesian form of the curve.
(b) Sketch the curve. Label the starting point and ending point, and draw an arrow on the curve to indicate the direction of travel.
(c) Find an equation for the curve's tangent line at the point $\left(\dfrac{\sqrt{2}}{2}, -\dfrac{\sqrt{2}}{2}\right)$.

9: 10 pts

Pg 5: 20 pts

10. Consider the polar curve $r = 1 - \sin\theta$. (a) Sketch the curve. (b) Set up but do not evaluate the integral for the area that lies inside the curve and is above the x-axis.

10: 10 pts

11. Determine if the series $S = \sum_{n=1}^{\infty} \frac{2^n + 3}{5^n + 2}$ converges or diverges. Indicate the test/s you used.

11: 10 pts

Pg 6: 20 pts

12. Determine if the series $S = \sum_{n=1}^{\infty} \frac{(-3)^n}{(2n+1)!}$ converges absolutely, converges conditionally or diverges. Indicate the test/s you used.

12: 10 pts

13. Find the interval and radius of convergence for the power series $f(x) = \sum_{n=0}^{\infty} \frac{2^n(x-1)^n}{2n^2+1}$.

13: 10 pts

Pg 7: 20 pts

14. Use any method to find the first 4 nonzero terms of the Maclaurin series for $f(x) = \dfrac{1}{(1-2x)^2}$.

14: 10 pts

15. Find the first 4 nonzero terms of the Maclaurin series for $f(x) = \dfrac{e^{x^2} - (1+x^2)}{x}$.

15: 10 pts

Pg 8: 20 pts