EXTRA PROBLEMS

1. Evaluate $\int_0^1 x^5 e^{x^3}\,dx$

A. 1 B. e C. $\frac{1}{3}$ D. $\frac{2}{3}e$ E. $\frac{2}{3}e - \frac{1}{3}$

2. Graph the curves on the same plane. At how many distinct point~~s~~(s) do the curves intersect?

$r_1 = 2\cos\theta \qquad r_2^2 = 2\cos(2\theta)$

A. 0 B. 1 C. 2 D. 3 E. 4

3. Evaluate

$$\int_0^1 \frac{x}{x^2+2x+1}\,dx =$$

A. $\ln(2)+1$ B. $\ln(2)$ C. $\ln(2)+\frac{1}{2}$ D. $\ln(2)-1$

E. $\ln(2)-\frac{1}{2}$

4. Let $C(t) = (2t - t^2,\ 3t - t^3)$. Which of the following ~~are~~ is true?

A. $C(t)$ is increasing and concave up at $t=3$

B. $C(t)$ is decreasing and concave up at $t=3$

C. $C(t)$ is increasing and concave down at $t=3$

D. $C(t)$ is decreasing and concave down at $t=3$

5. Let $C(t) = (2t - t^2,\ 3t - t^3)$
which of the following is true?

A. $C(t)$ has 1 horizontal tangent line and no vertical tangent lines

B. $C(t)$ has 1 horizontal tangent line and 1 vertical tangent line.

C. $C(t)$ has 2 horizontal tangent lines and no vertical tangent lines

D. $C(t)$ has 2 horizontal tangent lines and 1 vertical tangent line.

6. Find the volume V of the described solid S.
The base of S is triangular, with vertices
$(0,0)$, $(0,6)$, and $(6,0)$
Cross-Sections are $\perp$ to the y-axis and are semi-circles.

A. 3π B. 45π C. 9π D. $\frac{9\pi}{2}$

~~7. Find T_2, the Taylor polynomial of degree 2, centered at 2 for $f(x) = \frac{1}{x}$~~

7. Find T_2, the Taylor Polymomial of degree 2, centered at 3, for $f(x) = \frac{1}{x^2}$. Use T_2 to approximate $\frac{1}{(3.1)^2}$.

a. $\frac{1}{(3.1)^2} \approx \frac{1}{9} - \frac{2}{270} + \frac{1}{1350}$

b. $\frac{1}{(3.1)^2} \approx \frac{1}{9} + \frac{2}{270} - \frac{1}{1350}$

c. $\frac{1}{(3.1)^2} \approx \frac{1}{9} - \frac{2}{270} - \frac{1}{2700}$

d. $\frac{1}{(3.1)^2} \approx \frac{1}{9} - \frac{2}{270} - \frac{1}{3500}$

e. $\frac{1}{(3.1)^2} \approx \frac{1}{9} - \frac{2}{270} + \frac{1}{2700}$

$\boxed{8.}$ Determine the values of k for which the integral

$$\int_1^{\infty} \frac{x^{1/2}}{\sqrt[3]{x^k + 10x}}\, dx \quad \text{will converge.}$$

A. $\left[\frac{9}{2}, \infty\right)$

B. $\left(\frac{3}{2}, \infty\right)$

C. $\left(\frac{9}{2}, \frac{3}{2}\right)$

D. $(5, \infty)$

E. $\left(\frac{9}{2}, \infty\right)$

Answe Key

1. C. $\frac{1}{3}$

2. B. 1

3. E. $\ln(2) - \frac{1}{2}$

4. C. Increasing and Concave down

5. A. $C(t)$ has 1 HTL and NO VTL

6. C. 9π

7. E. $\frac{1}{(3.1)^2} \approx \frac{1}{9} - \frac{1}{270} + \frac{1}{2700}$

8. E. $\left(\frac{4}{2}, \infty\right)$