Are you Ready for Calculus 3 (Multivariable Calculus)?

1. Find all of the discontinuities of f(x), and identify the type of discontinuity.

$$f(x)=\frac{x^2-1}{x^2-7x+6}$$

For #2-6, evaluate the limit

2. $\lim\limits_{n\to\infty}\frac{3n^3-5n}{1-2n^2+n^3}$

3. $\lim\limits_{x\to 0}\frac{(x-5)^2-25}{x}=$

4. $\lim\limits_{x\to 0}\frac{e^{3x}-e^{5x}}{x}$

5. $\lim\limits_{h\to 0}\frac{\sqrt{5+h}-\sqrt{5}}{h}=$

6. $\lim\limits_{x\to 0}\frac{\sin 3x}{3x^2+6x}$

For #7-9, find the derivative

7. $y=e^{2x}-\ln x^2+\cos^2 4x$

8. $y=x^3e^{2x}-\sec 5x$

9. $y=\ln(\sin 2x)$

10. Find the local and absolute extrema for $f(x)=2x^3+9x^2+12x-1$ on [-3,2].

For #11-14, evaluate the integral

11. $\int(\cos 2x)e^{\sin 2x}dx$

12. $\int_1^2(xe^{6x})dx$

13. $\int\frac{x+2}{x^2+4x+9}dx$

14. $\int_1^3\left(\frac{x^2-1}{x+1}\right)dx$

15. The function f is continuous on the closed interval [2,8] and has values that are given in the table. Using three subintervals, approximate the right endpoint, left endpoint, and trapezoid approximation of $\int_2^8 f(x)dx$?

x	2	5	7	8
f(x)	10	30	40	20

16. Find the area of the region between the graphs of $y = \sin^2 x$ and $y = -x$ from $x = 0$ to $x = 2$

17. The length of the curve $y = x^3$ from (0,0) to (1,1)

18. If the region enclosed by the y-axis, the line y=2, and the curve $y = \sqrt{x}$ is revolved about the y-axis, find the volume of the solid generated.

19. Identify the Conic Section

(a) $x^2 + y^2 - 2x + 6y + 9 = 0$

(b) $x^2 - 25y^2 - 14x + 100y - 76 = 0$

(c) $3(y-2) = 2(x-15)$

(d) $x^2 + 36y^2 - 16x - 72y + 64 = 0$

(e) $x^2 + 4x - 8y + 12 = 0$

20. Change from Rectangular form to Polar form

(a) $xy = -4$

(b) $x^2 + y^2 - 3x = 10y$

21. Change from Polar form to Rectangular form

(a) $r = 4\csc\theta$

(b) $r = 6\cos\theta - 2\sin\theta$

22. Eliminate the parameter *t* and write the equation in rectangular form

(a) $x = 2t^2 + 3,\ y = t - 1$

(b) $x = 3\cos t,\ y = 3\sin t$