Review the Prerequisites for Calculus III

Name:

Panther ID:

- (a) Find the distance from the points in rectangular coordinates A(-2,3) and B(-3,-7)
- (b) Graph in xy-coordinates $y = \sin x$, $x^2 + 4y^2 = 1$, 2x + 3y = 6, xy = 4
- (c) Find the arc length of the parametric curve $x = t^2$, $y = t^3/3$, $0 \le t \le 1$
- (d) Find the arc length of the parametric curve $x = 2 \arcsin t$, $y = \ln(1 t^2)$, $0 \le t \le 1/2$

(1) a) Sketch the curve $x = 1 + \sin t$, $y = -1 + 2\cos t$, $0 \le t < 2\pi$ by eliminating the parameter and indicate the direction of increasing t b) Find dy/dx and d^2y/dx^2

(2) Use Cramer's rule to solve

a) Solve
$$\begin{cases} 9x - 4y = 5\\ 7x - 10y = -8 \end{cases}$$
 b) Solve
$$\begin{cases} 2x - 3y + 7z = -9\\ -3x + 4y - 2z = -8\\ 4x - 5y + 3z = 8 \end{cases}$$

(3) Find the derivative of

$$f(x) = 3x^5 + 3\cos^4(x) - \ln(x^2 + 1) - 4\tan(2x) + \sec(\sqrt{x}) + x\arctan(x^2) - e^{3x} + x^{\sqrt{2}} + x\arcsin(2x) + \sec(\sqrt{x}) + x\arctan(x^2) - e^{3x} + x^{\sqrt{2}} + x\arcsin(2x) + \frac{1}{2}\exp(-$$

(4) When evaluating limits, what are indeterminate forms? Evaluate the limits $\lim_{x\to\infty} \frac{4x^4 - 3x^2 + 5x + 9}{7x^4 + x^3 - 2x^2 + 6x + 8}$

- (5) If $\cos \theta = 0.3$ find $\cos(2\theta)$, and $\sin(2\theta)$
- (6) State the exact values of all 6 trig. $\cos\theta$, $\sin\theta$, $\tan\theta$, $\sec\theta$, $\csc\theta$, $\cot\theta$ functions when

$$\theta = 0; \pi/6, \pi/4, \pi/3, \pi/2, 2\pi/3, 3\pi/4, 5\pi/6, 7\pi/6, 5\pi/4, 4\pi/3, 3\pi/2, 11\pi/6, 5\pi/4, 5\pi/4,$$

(7) Find the indicated integral

a)
$$\int (x^5 - 3x + \sqrt{5}) dx$$
 b) $\int \frac{y^2 + 1}{y} dy$ c) $\int \frac{-4}{x\sqrt{1 - x^2}} dx$ d) $\int (2\sec^2 t - \sec t \tan t) dt$

(8) Plot in polar coordinates the point $(3, -2\pi/3)$. Find other polar coordinates (r, θ) for which

(a)
$$r > 0, \ 0 < \theta < 2\pi$$
 (b) $r < 0, \ 2\pi < \theta < 4\pi$

- (9) Identify and make of rough sketch of each polar equation
- a) $r = 2 + 2\sin(\theta)$ b) $r = 5\sin(4\theta)$ c) r = 4

(10) a) Find the length of the arc of a circle of radius r = 5 feet subtended by a central angle of $\theta = 48^{\circ}$

- b) Find the area of the sector of a circle
- (11) Find the surface area of a cylinder with height 5cm and radius 6cm

(12) a) Find the volume of the sphere with radius 300 meters b) Find the volume of the cylinder with diameter 80 meters and height 50 meters