Calculus –2 **Rivew for Final Exam** Name_____

Evaluate the integral.

1) $\int_0^{\pi/12} (1 + e^{\tan 3x}) \sec^2 3x \, dx$

2) $\int_0^{\pi/2} \cos^2 7x \sin^3 7x \, dx$

3) $\int \sec^3 9x \, dx$

Evaluate the improper integral or state that it is divergent.

4) $\int_0^{\infty} \frac{2dx}{81 + x^2}$

Integrate the function.

5) $\int \sqrt{16 - x^2} \, dx$

Evaluate the integral.

6) $\int e^{5x} \cos 8x \, dx$

Express the integrand as a sum of partial fractions and evaluate the integral.

7) $\int \frac{9x + 20}{x^3 + 4x^2 + 4x} \, dx$

Integrate the function.

8) $\int \frac{dx}{(49x^2 + 1)^2}$

Find the Maclaurin series for the given function.

9) $\sin 3x$

Find an equation for the line tangent to the curve at the point defined by the given value of t.

10) $x = 10t^2 - 7$, $y = t^3$, $t = 1$

Find the sum of the series as a function of x.

11) $\sum_{n=1}^{\infty} (x + 9)^n$

Find the value of d^2y/dx^2 at the point defined by the given value of t.

12) $x = 3 \sin t$, $y = 3 \cos t$, $t = \frac{3\pi}{4}$

Find the length of the curve.

13) $x = \frac{1}{3}y^{3/2} - y^{1/2}$ from $x = 1$ to $x = 4$

Determine either absolute convergence, conditional convergence or divergence for the series.

14) $\sum_{n=1}^{\infty} \frac{(-1)^n}{7n^{5/4} + 8}$

Find the slope of the polar curve at the indicated point.

15) $r = 3 \cos 3\theta$, $\theta = \frac{11\pi}{6}$

Change the given polar coordinates (r, θ) to Cartesian coordinates (x, y).

16) $\left(9, \frac{4\pi}{3}\right)$

Solve the problem.

17) The temperature of a hot liquid is 100° and the room temperature is 69°. The liquid cools to 92.8° in 6 min. What is the temperature after 14 min? Round your answer to the nearest degree.

Determine if the series converges or diverges; if the series converges, find its sum.

18) $\sum_{n=0}^{\infty} e^{-10n}$

Solve the problem.

19) Determine the particular solution to the differential equation with the given condition.

$\frac{dy}{dx} = 4 - \frac{2}{x}$; $x = 1$, $y = 5$

Solve the differential equation using separation of variables..

20) $\frac{dy}{dx} = y^2(4 - e^x)$