1. Integrate the following

a) $\int 7x \ln(2x)\ dx$

b) $\int \frac{22x+14}{8x^2+10x+3}\ dx$

c) $\int tan^3(7x)sec^3(7x)$ dx³

d) $\int \frac{\sqrt{49-x^2}}{14x}$ dx

e) $\int sin^3(3x)cos^3(3x)$ dx

f) $\int_0^2 2x^2e^{-x^3}\ dx$

2. Find each limit if it exists.

a) $\lim\limits_{x \to 0} \frac{e^{2x}+e^{x}-3x-2}{e^{5x}-5x-1}$

b) $\lim\limits_{x \to 0^{+}} (\sin(5x))^{\frac{2}{\ln(2x)}}$

3. Evaluate each improper integral if it converges, otherwise clearly state that it diverges.

a) $\int_0^\infty \frac{9}{25+x^2}\,dx$

b) $\int_4^5 \frac{7}{\sqrt[3]{x-4}}\,dx$

4. State whether the following converge conditionally, converge absolutely or diverge. Show all work and state the names of all tests used.

a) $\sum_{k=2}^{\infty} \frac{4k}{(2k+1)\ln(k)}$

b) $\sum_{k=1}^{\infty} \frac{(-1)^k (6k)}{4k^2-1}$

c) $\sum_{n=1}^{\infty} \frac{(-2)^n \, 2n!}{(n+3)!}$

d) $\sum_{n=1}^{\infty} \frac{(7n-1)^n}{(3n+2)^{2n}}$

5. Find the interval and radius of convergence for the given power series. Be sure to check the endpoints.

$$\sum_{n=1}^{\infty} \frac{(-3)^n(4x+8)^n}{\sqrt{2n+11}}$$

6. Determine the McLaurin series for the following. Give your answer in summation notation.

a) $f(x) = -8x^2 \sin(4x^3)$

b) g(x) = $\frac{e^{2x^3}}{2x^{-4}}$

7. Find the Taylor polynomial of order four for F(x) = 2sin(2x) where a = $-5\pi/6$.

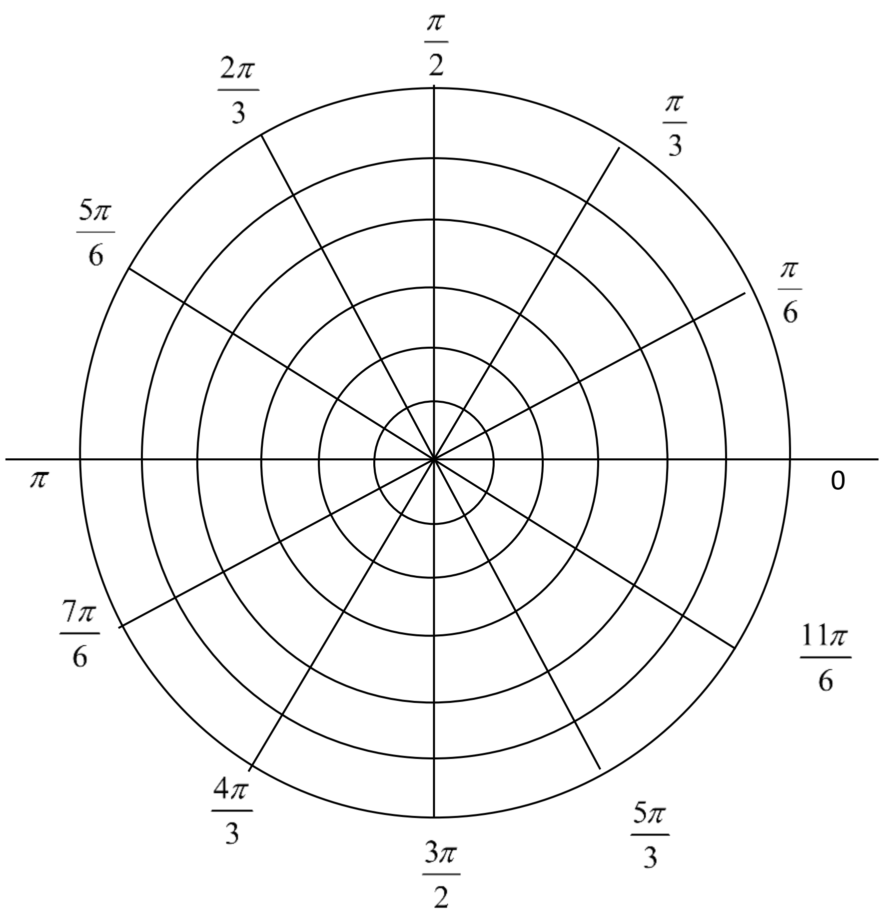
8. Evaluate the following integral to the nearest ten-thousandth. Use the appropriate number of terms in your evaluation.

$$\int_0^{0.31} e^{-2x^2}\,dx$$

9. Find the equation of the line which is tangent to the given parametric equation where t = 3. Give your answer in slope –intercept form.

$X(t) = e^{2t-6} + 2t + 1 \quad Y(t) = e^{t-3} + t^2 - 3$

10. a. Graph the polar equation $r = -4\sin(3\theta)$.



b. Find the area enclosed in this curve.

c. SET UP ONLY the integral which represents the arc length of this curve.

11. Find the length of the parametric curve from t = 0 to t = 2 for

$$X(t) = 4\sqrt{2}\,t + 7 \quad \text{and} \quad Y(t) = e^{2t} + 2e^{-2t} + 5$$

12. Eliminate the parameter and sketch the parametric equation given. Be sure to indicate the direction of travel.

$$X(t) = 2 + 3\sec t \qquad Y(t) = 2\tan t + 3 \quad \text{where } 0 \le t \le 2\pi .$$