TWELVE Do's on parts I, II (about 24%)

1. The Super-man Test is when the fraction |a_{n+1}/ a_n|= (2n+2)/2n+1.
Here rho =1. So no info. However|a_{n+1}/ a_n|= (2n+2)/(2n+1) > 1; so |a_n| is increasing.
Hence lim |a_n| \neq 0. So our series Diverges by n-th term Test

2 ab. Root Test works very well on Series [(3n+8)/5n+7)]^n
But the Root Test does not work on Series [(5n+8)/5n+7)]^n.
Here you need to factorize 5n & use FORMULA 5 (AN Old Problem!)

3 ab. Find the Maclaurin series of f(x) = 1/ (5+ 3x) & find its rdauis of convergence?
Hint= f(x)= 1/5 (1/ (1+ 3/5 x)
Now use 1/(1+x) = Series (-1) ^ x^n (from n=0 to inf) |x| <1

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4. Recall that we can differentiate/ integrate series.
Zample 1 : Differentiate both sides of 1/(1+x) = Series (-1)^ x^n
to find the value of Series (-1)^ n (1/2)^n (which is not GEOMETRIC)

5 ab. Do not forget the Binomial series
It applies to f(x) = 1/ cube-root (1+ x^2) & its integral from 0 to 0.1 (USE ASET)

6 abc. Series n ln (1+ 1/n^2) --- Series sin^3 (1/sqrt(n)) --- Series (e^{1/n} -1)
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7. In Limits &continuity, do not forget Rule 1 RULE 1 about POSITIVE numbers
like lim (x^3. y^5) / (x^4 +y^4) .sin (1/x) as (x,y) → (0,0).
Careful. If you use polar, you have to be careful in saying any any thing to be bounded.

8. In 14.5, you can either use Thomas formula Or you can use (Nahlus) LINEAR formula
Δ (f) ~ f_x $\Delta x + f_y\ \Delta y + f_z\ \Delta z \quad OR$
Δ (f) ~ f_u $\Delta u + f_v \Delta v + f_w\ \Delta w$

9. If we have F(x,y, z) = constant, you can say Partial z/Partial x = - F_x / F_z

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10. Let f(x,y,z) = e^(3x+4y) cos (kz) .
For which values of k, f(x,y,z) satisfies Laplace Equation f_xx + f_yy + f_zz= 0.
Answer: I think: k= 5, -5, 0

11. Chain Rule in 14.4: # 43 & 44c which were done in class

12. Directional Derivative: See the Example in BIG REview