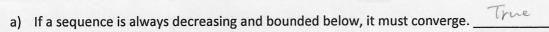
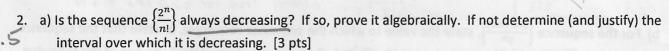
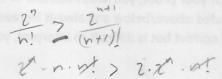
1. Answer True or False for each statement. [1 pt each]



- If a sequence has an upper and a lower bound, then it the sequence must have a limit.
- d) If a sequence $\{a_n\}$ is everywhere decreasing, then $a_n \geq a_{n+1}$ for all values of n.
- e) If $a_n \le b_n \le c_n$ for all n, and a_n converges to -1 and c_n converge to 1, then b_n converges to 0. Take
- f) If $a_n > -n$ for all n, this proves that $\{a_n\}$ converges.





$$\frac{2^n}{n!} > \frac{2^{n+1}}{(n+1)!}$$

Reguence $\{\frac{2^n}{n!}\}$ is decreasing after $n=2$
 $2^n - n \cdot n! > 2 \cdot 2^n \cdot n!$

Interval: $(2, \infty)$

b) Do one additional thing to prove that the sequence above converges. Include a conclusion statement. [3 pts]

3. Find the limit of each sequence, or say "diverges" if the sequence diverges. No formal proof is required. [2 pts each]

a)
$$a_n = 2n - \frac{7}{n}$$

b)
$$b_n = \frac{b_{n-1}}{2} - 1$$
; $b_1 = 3$

$$b_n = \frac{b_n}{2} - 1$$

$$b_n = -1$$

$$b_n = -1$$

$$limit - 2$$

3 c)
$$c_n = \frac{n}{3^n}$$

1: mit: 0

3 dominates n

a) For the sequence $\left\{\frac{2n+1}{5n+4}\right\}$, state the value to which the sequence converges, or state that the sequence diverges. CLEARLY justify your answer with a neighborhood proof for general ϵ . If your work is correct but is difficult to interpret, you may not receive full credit. [4 pts]

the value to which the sequence converges (or say "diverges"): _

Show your work here:

N7-3+204

Show your work here:

$$\frac{2}{5} - 2 < \frac{2n+1}{5n+4} < \frac{2}{5} + 2$$
 $\frac{2-52}{5} < \frac{2n+1}{5n+4} < \frac{2n+1}{5n+4} < \frac{2+52}{5}$
 $\frac{2-52}{5} < \frac{2n+1}{5n+4} < \frac{2n+1}{5n+4} < \frac{2+52}{5}$
 $\frac{2n+1}{5n+4} < \frac{2n+1}{5n+4} < \frac{2$

-3-20 (25 n -3-208 en always true for 6>0 and n 61N

M = [3+20 E] +1 For all n 2 M, the seguence { 2n+1} lies within the nelshborhood

b) For the sequence $\left\{\frac{\cos{(4n)}}{5^n}\right\}$, state the value to which the sequence converges, or state that the sequence diverges. CLEARLY justify your answer with a proof. For your proof, you MUST use one of the following tests: the squeeze theorem OR the big theorem (bounded above/below and always increasing/decreasing theorem) OR the comparison principle. If your work is correct but is difficult to interpret, you may not receive full credit. [4 pts]

Test/Principle used: Squeeze Theorem

the value to which the sequence converges (or say "diverges"): _

Show your work here:

i, always true

Since - in and in both converge to 0 and for (cos (4h) () as proved to the left, the sequence { cos(40) } must converge to 0