Recitation Handout 15: Practice Using Convergence Tests

Determine the convergence or divergence of each of the following series. In each case, demonstrate that your answer is correct in a step-by-step fashion using *an appropriate convergence test*. Be sure to explicitly state which convergence test you have used and show that it can be used with the series you are working on. Be careful to show all of your work and how the convergence test justifies your answer.

(a) Does the following series converge or diverge? $\displaystyle\sum_{n=1}^{\infty} \frac{n^2}{1+4n^2}$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

(b) Does the following series converge or diverge? $\sum_{n=1}^{\infty} \frac{10^n \cdot \sqrt{n}}{(n+1)!}$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

(c) Does the following series converge or diverge? $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^2+1}$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

(d) Does the following series converge or diverge? $\sum_{n=1}^{\infty} \frac{1+\sin(n)}{n^2}$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

(e) Does the following series converge or diverge? $1+\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{3}}+\frac{1}{\sqrt{4}}+...$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

(f) Does the following series converge or diverge? $\sum_{n=1}^{100} \frac{2n}{1+n^2}$

CONVERGENCE TEST USED:

STEP-BY-STEP JUSTIFICATION:

FINAL CONCLUSION: CONVERGES DIVERGES

ANSWERS:

(a) Diverge. **(b)** Converge. **(c)** Converge. **(d)** Converge.
(e) Diverge. **(f)** Converge.