## Convergence of Series IV - Answer Key

1. Is 
$$\sum_{n=1}^{\infty} \left( \frac{8}{2^n} + \frac{1}{n} \right)$$
 convergent? Why?

No, because  $\sum_{n=1}^{\infty} \frac{1}{n}$  is divergent.

2. Is 
$$\sum_{n=0}^{\infty} \frac{1}{n^2 + n}$$
 convergent? Why?

Yes, by the comparison test.

3. Is 
$$\frac{1}{3} - 1 + 3 - 9 + 27 - \cdots$$
 convergent? Why?

No, the first and second conditions of AST are not satisfied.

4. Is 
$$\sum_{n=0}^{\infty} (0.9)^n - (0.2)^n$$
 convergent? Why?

Yes, both the series are convergent geometric series.

5. Is 
$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}(\sqrt{n} + e^{-n})}$$
 convergent? Why?

No, by the comparison test.

6. Is 
$$\sum_{n=1}^{\infty} \frac{1}{n^{3-\cos(n)}}$$
 convergent? Why?

Yes, by the comparison test.

7. Is 
$$\sum_{n=2}^{\infty} \frac{\sin(n\pi)}{\sqrt{n^2+1}}$$
 convergent? Why? Yes, by AST.

8. Is 
$$\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^2}$$
 convergent? Why?

Yes, by the integral test.

9. Is 
$$\sum_{n=0}^{\infty} \frac{(-1)^n e^{\frac{1}{\sqrt{n}}}}{n^2}$$
 convergent? Why? Yes, by AST.

10. Is 
$$\sum_{n=0}^{\infty} \frac{1}{n^{1+\frac{1}{\sqrt{n}}}}$$
 convergent? Why?

No, by the integral test.

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