

## Solutions to problems 2–5 for Sample Exam 2

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2.  $C$  = Convergent,  $D$  = Divergent,  $GS$  = Geometric Series,  $IT$  = Integral Test,  $CT$  = Comparison Test,  $LCT$  = Limit Comparison Test,  $AST$  = Alternating Series Test,  $RT$  = Ratios Test.

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|-----|------------------|-----|---------------------------------|
| (a) | $C, GS$          | (b) | $C, GS$                         |
| (c) | $C, p$ -series   | (d) | $C, GS$                         |
| (e) | $C, IT$          | (f) | $C, CT$                         |
| (g) | $C, LCT$         | (h) | $C, LCT$                        |
| (i) | $D, LCT$         | (j) | $D, \text{Test for Divergence}$ |
| (k) | $C, AST$         | (l) | $D, AST, \lim \neq 0$           |
| (m) | $D, \lim \neq 0$ | (n) | $C, AST$                        |
| (o) | $C, AST$         | (p) | $C, RT$                         |
| (q) | $C, RT$          | (r) | $D, RT$                         |

3. Find the radius of convergence of the following power series.

- (a)  $R = 3$       (b)  $R = 1$       (c)  $R = 2$       (d)  $R = 3/2$

4. Find the interval of convergence of the following power series.

- (a)  $1 < x \leq 3$       (b)  $-5 < x < -1$       (c)  $4/3 < x < 8/3$   
(d)  $1 - \sqrt[3]{2} < x < 1 + \sqrt[3]{x}$

5. Suppose that the series  $\sum_{n=1}^{\infty} c_n(x-1)^n$  converges when  $x = 4$  and diverges when  $x = 6$ . What can be said about the convergence or divergence of the following series ?

- (a) *Converges*      (b) *Undecided*      (c) *Converges*