

9.2 Geometric Series

Pg. 601 #'s 7, 8, 15, 16, 25, 26, 29, 30, 33, 91-94

$$7) \sum_{n=0}^{\infty} \left(\frac{7}{6}\right)^n$$

$$r = \left|\frac{7}{6}\right| > 1$$

Diverges by
Geometric test

$$16) \sum_{n=1}^{\infty} 2\left(-\frac{1}{2}\right)^n$$

$$r = \left|-\frac{1}{2}\right| < 1$$

Converges by
Geometric test

$$29) 8 + 6 + \frac{9}{2} + \frac{27}{8}$$

$$\sum_{n=0}^{\infty} 8\left(\frac{3}{4}\right)^n$$

$$r = \left|\frac{3}{4}\right| < 1 \text{ converges}$$

$$\frac{8}{1 - 3/4} = \frac{8}{1/4} = 32$$

the series converges
to 32

$$8) \sum_{n=0}^{\infty} 4(-1.05)^n$$

$$r = |-1.05| > 1$$

Diverges by
Geometric test

$$25) \sum_{n=0}^{\infty} 5\left(\frac{2}{3}\right)^n$$

$$r = \left|\frac{2}{3}\right| < 1 \text{ converges}$$

$$\frac{5}{1 - 2/3} = \frac{5}{1/3} = 15$$

the series converges
to 15

$$30) 9 - 3 + 1 - \frac{1}{3}$$

$$\sum_{n=0}^{\infty} 9\left(-\frac{1}{3}\right)^n$$

$$r = \left|-\frac{1}{3}\right| < 1 \text{ converges}$$

$$\frac{9}{1 - 1/3} = \frac{9}{2/3} = \frac{27}{2}$$

the series converges
to $\frac{27}{2}$

$$15) \sum_{n=0}^{\infty} \left(\frac{5}{6}\right)^n$$

$$r = \left|\frac{5}{6}\right| < 1$$

Converges by
Geometric test

$$26) \sum_{n=0}^{\infty} \left(-\frac{1}{5}\right)^n$$

$$r = \left|-\frac{1}{5}\right| < 1 \text{ converges}$$

$$\frac{1}{1 - (-1/5)} = \frac{1}{6/5} = \frac{5}{6}$$

the series converges
to $5/6$

$$33) \sum_{n=1}^{\infty} (\sin 1)^n$$

$$r = |\sin 1| < 1 \text{ converges}$$

$$\frac{1}{1 - \sin 1} \text{ for } n=1$$

$$\sin 1 - \frac{1}{1 - \sin(1)} \text{ for } n=0$$

91) False, n^{th} term states that it might converge

92) True

93) False, that is for $\sum_{n=0}^{\infty} r^n$. The sum will be $\frac{a}{1-r} - a_0$

94) True