

Daily HW #17 11.2# 19, 20, 22, 24, 51.

19. $10 - 2 + 0.4 - 0.08 + \dots$

$\begin{matrix} \vee & \vee & \vee \\ x^{1/5} & x^{1/5} & x^{-1/5} \end{matrix}$
 $r = -1/5$

$$\sum_{l=0}^{\infty} 10 \left(-\frac{1}{5}\right)^l = 10 \left(\frac{1}{1 - (-1/5)}\right) = \frac{50}{6} = \frac{25}{3}$$

20. $2 + .5 + .125 + .03125 + \dots$

$\begin{matrix} \vee & \vee & \vee \\ x^{1/4} & x^{1/4} & x^{1/4} \end{matrix}$
 $r = 1/4$

$$\sum_{l=0}^{\infty} 2 \left(\frac{1}{4}\right)^l = 2 \left(\frac{1}{1 - 1/4}\right) = \frac{8}{3}$$

22. $\sum_{n=1}^{\infty} \frac{10^n}{(-9)^{n+1}} = 10 + \frac{10^2}{(-9)} + \frac{10^3}{(-9)^2} + \frac{10^4}{(-9)^3}$

"reindexing" \rightarrow

$$= 10 + 10 \left(\frac{10}{-9}\right) + 10 \left(\frac{10}{-9}\right)^2 + 10 \left(\frac{10}{-9}\right)^3$$

$$= \sum_{l=0}^{\infty} 10 \left(\frac{-10}{9}\right)^l \quad \text{LOOK!}$$

$$r = \frac{-10}{9}$$

and $r < -1$, so
the series
DIVERGES.

$$24. \sum_{n=0}^{\infty} \frac{1}{(\sqrt{2})^n} = \sum_{n=0}^{\infty} \left(\frac{1}{\sqrt{2}}\right)^n = \frac{1}{1 - (1/\sqrt{2})} = \frac{\sqrt{2}}{\sqrt{2} - 1}$$

$$51. 0.\overline{8} = .8888\dots = .8 + .08 + .008 + \dots$$

$$= \sum_{k=1}^{\infty} 8 \left(\frac{1}{10}\right)^k = 8 \left(-1 + \sum_{k=0}^{\infty} \left(\frac{1}{10}\right)^k\right)$$

$$= 8 \left(-1 + \frac{1}{1 - 1/10}\right)$$

$$= 8 \left(-1 + \frac{10}{9}\right) = \frac{8}{9}$$