9.1 Even Answers

Part A

2) a) $a_n = \left(\frac{1}{3}\right)^n$

b) $a_n = \frac{(-1)^{n-1}}{n}$

c) $a_n = 5(0.1)^n = \frac{5}{10^n}$

4) The same... $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} \ldots$

6) Different $\sum_{n=1}^{\infty} \left(-\frac{1}{2}\right)^{n-1} = 1 - \frac{1}{2} + \frac{1}{4} \ldots$,

$\sum_{n=1}^{\infty} \frac{(-1)^n}{2^{n-1}} = -1 + \frac{1}{2} - \frac{1}{4} + \frac{1}{8} \ldots$

8) Diverges because terms don't approach 0

10) Diverges because terms do not approach 0

12) Converges to $\frac{30}{11}$

14) Diverges because terms do not approach 0

16) Converges to 1

24) $\sum_{n=0}^{\infty} \frac{e^{n\pi}}{\pi^{ne}}$ is a geometric series

$r = \frac{e^{\pi}}{\pi^e} \approx 1.03 \quad \therefore$ Diverges

36) Total Distance = 16 m

38) 8 m^2

40) a) $S - rS = a - ar^n$

b) $S = \frac{a - ar^n}{1 - r}$

48) $\sum_{n=0}^{\infty} (e^b)^n \qquad b = \ln\left(\frac{8}{9}\right) = \ln 8 - \ln 9$

Part B

18) $f(x) = \frac{1}{x+2} \qquad -2 < x < 0$

20) $f(x) = \frac{6}{3-x} \qquad -1 < x < 3$

22) $f(x) = \frac{1}{1 - \tan x}$

$-\frac{\pi}{4} + k\pi < x < \frac{\pi}{4} + k\pi$

42) $-\frac{1}{3} < x < \frac{1}{3}$

44) $-1 < x < 1$

46) $0 < x < 2$

50) a) General term: $(-1)^n(4t^{2n})$

b) General term: $(-1)^n\left(\frac{4}{2n+1}\right)x^{2n+1}$

c) $-1 < t < 1$

d) $x = \pm 1$

$G(1)$ and $G(-1)$

are both convergent series

52) Find series for $\frac{1}{1-x^2}$ and differentiate the terms

Interval of convergence $-1 < x < 1$