

1. a.  $f(x) = \ln(x+1)$ ;  $p_3(x) = x - \frac{1}{2}x^2 + \frac{1}{6}x^3$ ;  $\ln(1.25) = f\left(\frac{1}{4}\right) \approx p_3\left(\frac{1}{4}\right) = \frac{85}{384}$   
 b.  $f(x) = (x+1)^{-1}$ ;  $p_3(x) = 1 - x + x^2 - x^3$ ;  $(0.7)^{-1} = f\left(-\frac{3}{10}\right) \approx p_3\left(-\frac{3}{10}\right) = \frac{1417}{1000}$   
 c.  $f(x) = e^x$ ;  $p_3(x) = 1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3$ ;  $e = f(1) \approx p(1) = \frac{17}{6}$   
 d.  $f(x) = (8+x)^{1/3}$ ;  $p_3(x) = 2 + \frac{1}{12}x - \frac{1}{288}x^2 + \frac{5}{20736}x^3$ ;  $(8.5)^{1/3} = f\left(\frac{1}{2}\right) \approx p_3\left(\frac{1}{2}\right) = 2 + \frac{6773}{16588}$

2. a.  $\sum_{k=0}^{\infty} \frac{(-1)^k x^7}{k!}$ ;  $x \in \mathbf{R}$       b.  $-\sum_{n=1}^{\infty} \frac{6^n x^{2n}}{n}$ ;  $|x| < \frac{1}{\sqrt{6}}$       c.  $\sum_{k=0}^{\infty} \frac{(-1)^k (3x)^{2k}}{(2k)!}$ ;  $x \in \mathbf{R}$

3. a. conditionally convergent      b. absolutely convergent      c. divergent  
 d. absolutely convergent      e. divergent      f. absolutely convergent  
 g. conditionally convergent

4. a.  $[0, 2)$ ;  $x = 0$       b.  $[3, 11]$ ; none      c.  $(-\infty, \infty)$ ; none  
 d.  $\left(\frac{-1}{4}, \frac{1}{4}\right)$ ; none      e.  $(3, 5)$ ; none      f.  $[-11, -9)$ ;  $x = -11$

5. a.  $343 \sum_{n=0}^{\infty} \frac{(\ln 7)^n (x-3)^n}{n!}$       b.  $2 \sum_{n=0}^{\infty} \frac{x^{2n+1}}{2n+1}$

6. a.  $|x| \leq 1$       b.  $\frac{1}{ab} \sum_{n=0}^{\infty} (-1)^n \left(\frac{a}{b}\right)^{2n} \frac{x^{2n}}{2n+1}$       c.  $\sum_{n=0}^{\infty} \frac{(-1)^n x^{4n}}{2n+1}$

7. a. No      b. Yes      c. No      d. Yes

8. a.  $(0, 9)$       b.  $(2, -2\sqrt{3})$       c.  $(-\frac{7}{2}\sqrt{3}, \frac{7}{2})$       d.  $(\pi \cos 3, \pi \sin 3)$

9. 10. See graphs on next page.

11. a.  $7x - 8y = 1$       b.  $xy = 10$       c.  $|x + y| = 19$

12. a.  $r = 4 \cos \theta$       b.  $r^2 \cos 2\theta = 4$       c.  $r^2 \sin 2\theta = 2$

13. a.  $\left(\frac{18+7\sqrt{2}}{2}, \frac{\pi}{4}\right)$ ;  $\left(\frac{18-7\sqrt{2}}{2}, \frac{5\pi}{4}\right)$   
 b.  $\left(1, \frac{\pi}{8}\right)$ ;  $\left(1, \frac{3\pi}{8}\right)$ ;  $\left(1, \frac{5\pi}{8}\right)$ ;  $\left(1, \frac{7\pi}{8}\right)$ ;  $\left(1, \frac{9\pi}{8}\right)$ ;  $\left(1, \frac{11\pi}{8}\right)$ ;  $\left(1, \frac{13\pi}{8}\right)$ ;  $\left(1, \frac{15\pi}{8}\right)$

14. a. 0      b. 0      c.  $-4\pi$       d.  $-\frac{1}{3}$

15. a.  $\frac{9}{2}$       b.  $\frac{32}{3}\pi - 8\sqrt{3}$       c.  $\frac{3}{4}\sqrt{3}$       d.  $\frac{3}{2}\pi a^2$       e.  $18\pi^3$

16. a.  $\frac{3}{2} \left[ \sqrt{2} + \ln(\sqrt{2} + 1) \right]$       b. 14      c.  $\sqrt{2}$

17. a.  $r < 3 \cos \theta + \sin \theta$       b.  $\frac{5}{2}\pi$       c.  $\sqrt{10} \pi$       d.  $-\frac{1}{3}$

