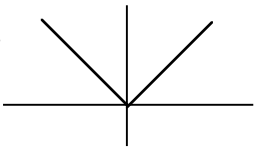
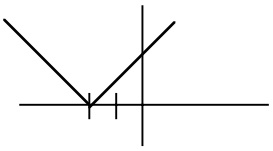
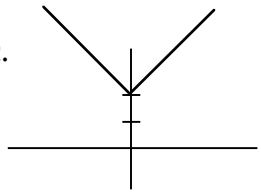
BC Calculus
Test # 1 (1–40) Review Answers

18a. D: $\{x \in \Re\}$ R: [2, 4] b. D: $\left[-\frac{2}{3}, \infty\right)$ R: $[0, \infty)$

19. $f'(x) = \frac{1}{x^2}$

20a. 14.981 b. $Y_1 = \sqrt{\left(16 - x^2\right)}, \quad Y_2 = -Y_1$

21a.  b.  c. 

22. $-3{,}041{,}280\,x^9y^3$

23a. $x = \frac{\pi}{12}, \frac{\pi}{6}, \frac{7\pi}{12}, \frac{2\pi}{3}$

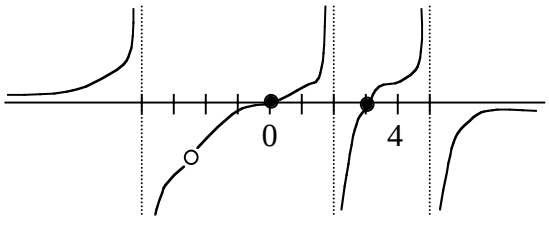
b. ellipse, $Y_1 = 2 + \sqrt{\left(-4/9x^2 + 8/3x\right)}, \quad Y_1 = 2 - \sqrt{\left(-4/9x^2 + 8/3x\right)}$

24. $s'(t) = \frac{1}{2\sqrt{t}} - \frac{2}{t^3} + \frac{2}{3\sqrt[3]{t^5}}$

25. $\frac{dy}{dx} = -4x^{-2} - 3\sqrt{3}\,x^{\sqrt{3}-1} + 6\pi x^{\pi-1}$

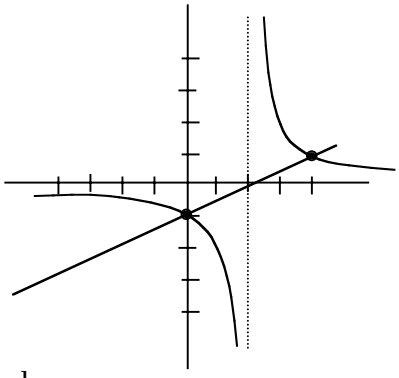
26a. $y' = \frac{3}{x} + 2\cos x - 6e^x + 7\sin x$ b. 91.24 days

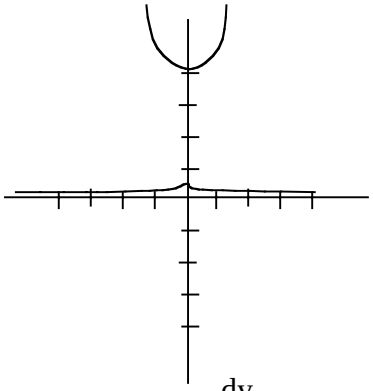
27a. $\frac{\sqrt{3}}{2}$ b. 40 c. $y = \frac{1}{3}x - 1 + \ln 3$ or $y \approx \frac{1}{3}x + 0.0986$

28a. 

b. $\frac{\sqrt{3}}{2}$

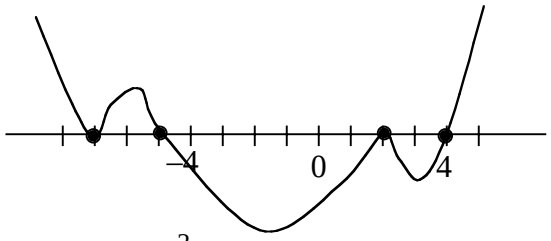
29a. $dy = -6x^{-3}\,dx - \frac{4}{t}dt - 6\sin u\,du - \frac{2}{5}k^{-3/5}\,dk$ b. $f'(5.18) = 8{,}561{,}220{,}899$

30a. 

b. 

31a. $\frac{dy}{dx} = \cos(2x)$ b. $\frac{dy}{dx} = e^x(\cos x + \sin x)$ c. $\frac{dy}{dx} = 1 + \ln x$

32a. $x^2 + \pi$ b. $-\cos x + C$ c. $\sin x + C$

33. 

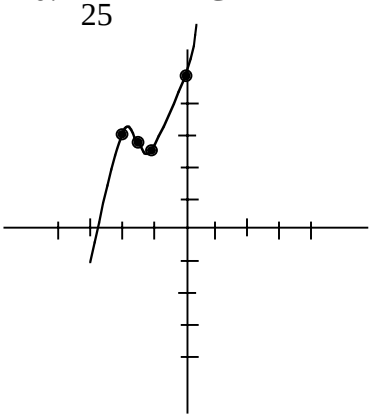
34a. $\frac{dy}{dx} = \frac{2xy^3 - y - 2}{x - 3x^2y^2}$ b. $y = \frac{8}{9}x - \frac{7}{9}$

35a. $3\sin x + C$ b. $\frac{2}{15}x^5 + C$ c. $\frac{x^{e+1}}{e+1} + C$ d. $\frac{9}{25}x^{5/3} + C$

36a. end points and cusp points b. $f'(x) = 0$

c. critical numbers $f'(x) = 0$ or $f'(x)$ does not exist

d. max (–2, 3) min (–1, 2.5) inf (–1.5, 2.75)



37a. $\frac{dy}{dx} = 3\left(3x^2 + 6x - 3\right)^2(6x + 6)$ b. $\frac{dy}{dx} = \frac{\cos(\ln x)}{x}$

c. $\frac{dy}{dx} = -\frac{3}{x}$ d. $\frac{dy}{dx} = e^{\sin x^2} 2x\cos x^2$

38. $\frac{6}{35}x^{5/3} + 3e^x + 4\cos x + \frac{2}{5}\ln|x| + C$

39. $10\frac{3}{8}$

40a. –0.305 b. 64 units/sec