

Exercises 10.1, page 645

2. $y = -2x + 3$ for $-1 \leq x \leq 4$

4. $9x = (6 - y)^2$

10. $x^2 + 4y = 4$

12. $y = e^{x/2}$ for $x \geq 0$

36. $x = a \sec \theta, y = b \sin \theta$

38. $x = 2a \sin^2 \theta, y = 2a \sin^2 \theta \tan \theta$

Exercises 10.2, page 653

2. $\frac{2\sqrt{t}(3t^2 - 1)}{1 - 2\sqrt{t}}$

4. $\frac{1 + e^t}{e^t + te^t}$

8. $x - \pi y - \pi^2 = 0$

14. $\frac{dy}{dx} = -\frac{2}{3t + 2}, \frac{d^2y}{dx^2} = \frac{2}{3t(3t + 2)^3}$

20. The curve has horizontal tangents at $(-2, -2)$ and $(-4, 2)$ and it has vertical tangents at $(0, 0)$ and $(-4, 2)$ (it has a cross over at $(-4, 2)$; one tangent at $(-4, 2)$ is horizontal and the other is vertical). The curve goes \nearrow when $t < -1$ or $t > 2$, \searrow when $-1 < t < 0$, \swarrow when $0 < t < 1$ and \nwarrow when $1 < t < 2$.

28. The curve has a cross over at $(0, 0)$ (when $t = \pi/4$ or $3\pi/4$) and the two tangents at $(0, 0)$ are $y = x$ and $y = -x$.

34. $\frac{15}{4} - 4 \ln 2$

Exercises 10.3, page 659

8. $e^3 - e^{-3}$

16. $2 \ln(\sqrt{5} + 2) + 4\sqrt{5}$

24. $\frac{48}{5}\pi$

30. $\pi(e^2 + 2e - 6)$

Exercises 10.4, page 668

6. (a) $(2, 4\pi/3), (-2, \pi/3)$ (b) $(\sqrt{13}, \pi - \tan^{-1}(3/2)), (-\sqrt{13}, -\tan^{-1}(3/2))$

14. $\sqrt{r_1^2 + r_2^2 - 2r_1r_2 \cos(\theta_1 - \theta_2)}$

16. $x = 1$

20. $x \tan(x^2 + y^2) = y$

24. $r \cos^2 \theta = 4 \sin \theta$

26. $r^2 \cos 2\theta = 1$

30. $(x - 1)^2 + (y - 1)^2 = 2$

60. $(\sin e + e \cos e)x + (e \sin e - \cos e)y - e = 0$

66. The curve has horizontal tangents at the points $(e^{k\pi - \pi/4}, k\pi - \pi/4)$ and vertical tangents at the points $(e^{k\pi + \pi/4}, k\pi + \pi/4)$ for all integers k .

Exercises 10.5, page 674

2. $\frac{1}{2}(e^{2\pi} - e^\pi)$

8. $\pi/16$

32. $2 - \sqrt{3} + \frac{\pi}{3}$

46. $\frac{\sqrt{5}}{2}(e^{2\pi} - 1)$

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