

Partial solutions for 2, 3, 4, 8, 9, 14, 17, 18, 29, 41, 42

2.  $\frac{dy}{dx} = \frac{1 + \cos(t)}{e^t(t+1)}$

3.  $\frac{dy}{dx} = \frac{4t^3 + 1}{3t^2}$ . Tangent line:  $y = -x$

4.  $\frac{dy}{dx} = 4\sqrt{t}(t-1)$ . Tangent line:  $y = 24x - 40$

8.  $\frac{dy}{dx} = 4t^{3/2}e^{t^2}$ . Tangent line:  $y = 4ex - 7e$ . Remove parameter to get  $y = e^{t^2}$ .

9.  $\frac{dy}{dx} = \frac{2t+1}{2t-1}$ . Tangent line:  $y = 3x + 3$

14.  $\frac{dy}{dx} = \frac{e^t}{2t}$  and  $\frac{d^2y}{dx^2} = \frac{e^t(t-1)}{4t^3}$ . Concave up when  $t < 0$  or  $t > 1$ .

17. Horizontal tangent at (0,-3) and vertical tangents at (2, -2) and (-2, -2).

18. Horizontal tangents at (0,0) and (2,-4). Vertical tangents at (2,-4) and (-2, -2).

29. At  $t = 1$ . Point is (4,0).

41.  $4\sqrt{2} - 2$

42.  $e^2 + 1$