1. Which of the following parametric equations describe the same curve?
   (a) $x = 2t^2, y = 4 + t; -4 \leq t \leq 4$
   (b) $x = 2t^4, y = 4 + t^2; -2 \leq t \leq 2$
   (c) $x = 2t^{2/3}, y = 4 + t^{1/3}; -64 \leq t \leq 64$

2. Find the points on the curve

$$x = 2\cos t + 3\sin t, y = 2\sin t + 3\cos t$$

   which have tangents of slope -1.

3. **Lissajous curves.** Estimate the coordinates of the points on the following curves at which there are horizontal or vertical tangent lines.

   (a) $x = \sin 2t, y = 2\sin t; 0 \leq t \leq 2\pi$

   (b) $x = \sin 4t, y = \sin 3t; 0 \leq t \leq 2\pi$

4. Find the area under one arch of the cycloid

$$x = 3(t - t\sin t), y = 3(1 - \cos t)$$

5. Find the area of the surface obtained by revolving the curve

$$x = t - \sin t, y = 1 - \cos t; 0 \leq t \leq 2\pi$$

about the x-axis.

6. For a curve given by the parametric equations $x = f(t), y = g(t)$, where f and g are twice differentiable, find a rule to compute the second derivative $\dfrac{d^2y}{dx^2}$.