PARAMETRIC FORM OF A FUNCTION OR RELATION

For questions **1** to **14**, find the Cartesian equation of the curves with the parametric equations given.

1 $x = 2t, y = t + 2$ **2** $x = t, y = t^2$ **3** $x = t, y = \frac{1}{t}$ **4** $x = 2\cos\theta, y = 2\sin\theta, 0 \leq \theta \leq 2\pi$

5 $x = 2\cos\theta, y = 2\sin\theta, 0 \leq \theta \leq \pi$ **6** $x = t + 3, y = t^2 - 5, t \geq 0$ **7** $x = 2u - 2, y = 3u + 1, 1 \leq u \leq 3$

8 $x = v^3, y = 1 - v^2, -1 \le v \le 1$ **9** $x = t + 2, y = t^2 - 1$ **10** $x = \cos t, y = \cos t, 0 \le t \le 2\pi$ **11** $x = 2t^2, y = 4t$

12 $x = 2\cos\theta, y = \sqrt{3}\sin\theta, 0 \le \theta \le 2\pi$ **13** $x = 2\cos t, y = \sin t, 0 \le t \le \pi$ **14** $x = \frac{2t}{1+t^2}, y = \frac{1-t^2}{1+t^2}$

15 Two boats on a lake start sailing at the same time. Boat A moves on a course given by $x = \frac{t}{2}, y = t + 1$, while boat B moves on a course given by $x = t - 2, y = -2t + 9$, where t is the time elapsed in hours.

(a) Find the Cartesian equation for the course of each boat. Show that the courses intersect at the point $(1, 3)$.

(b) Do the boats collide? Justify your answer.

18 Sketch the graph of each curve from its parametric equations.

(a) $x = t + 1, y = 2t - 1$ **(b)** $x = t, y = 2t^2$ **(c)** $x = \frac{t}{2}, y = t^2$

(d) $x = 4\sin\theta, y = 4\cos\theta$ **(e)** $x = \frac{\sin\theta}{2}, \ y = \frac{\cos\theta}{2}$