Parametric Equations: Converting to Cartesian form (1)

Find the cartesian equation of the curves given by the parametric equations

① $x = 2t + 3$, $y = t^2$

② $x = t + \dfrac{1}{t}$ $\qquad y = t - \dfrac{1}{t}$

① $x = 2t + 3$ ① $\qquad y = t^2$ ②

from ① $t = \dfrac{x-3}{2}$

Sub. into ②

$y = \dfrac{(x-3)^2}{4}$

② $x = t + \dfrac{1}{t}$ ① $\qquad y = t - \dfrac{1}{t}$ ②

① + ② $\qquad x + y = 2t$

$\therefore t = \dfrac{x+y}{2}$

Sub. into ①

$x = \dfrac{x+y}{2} + \dfrac{2}{x+y}$

$\therefore 2x(x+y) = (x+y)^2 + 4$

$\therefore 2x^2 + 2xy = x^2 + 2xy + y^2 + 4$

$\therefore x^2 = y^2 + 4$

$\therefore y^2 = x^2 - 4$

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