Q1: Determine A so that the curve

$y = 3x + 5$

can be written in parametric form as
$x(t) = t - 2,\ y(t) = At - 1$

$3x + 5 = At - 1 \qquad x = t - 2$
$\quad +1 \qquad\quad +1$

$3x + 6 = At$

$3(t-2) + 6 = At$

$3t \cancel{- 6 + 6} 0 = At$

$\frac{3\cancel{t}}{\cancel{t}} = \frac{A\cancel{t}}{\cancel{t}}$

$\boxed{3 = A}$

Q2: Determine a Cartesian equation for the curve given in parametric form by: $x(t) = 4\ln(4t),\ y(t) = \sqrt{t}$

$(y)^2 = \cancel{(t^{1/2})^2}$

$x = \frac{4\ln(4y^2)}{4} \qquad y^2 = t$

$\frac{x}{4} = \ln(4y^2)$

$e^{(\frac{x}{4})} = e^{\ln(4y^2)}$

$\frac{e^{\frac{x}{4}}}{4} = \frac{\cancel{4}y^2}{\cancel{4}}$

$\sqrt{\frac{e^{\frac{x}{4}}}{4}} = y = \boxed{\cancel{\pm}\frac{1}{2}e^{\frac{x}{8}}}$

Q4: Determine a Cartesian equation for the curve given in parametric form by $x(t) = 4e^{t},\ y(t) = 3e^{-2t}$.

$x = 4e^{t} \qquad \frac{y}{3} = \frac{3e^{-2t}}{3}$

$\ln\left(\frac{y}{3}\right) = \ln(e^{-2t})$

$\frac{x = 4e^{-\frac{1}{2}\ln(\frac{y}{3})}}{4} \qquad \frac{\ln(\frac{y}{3})}{-2} = \frac{-\cancel{2}t}{\cancel{-2}}$

$\frac{x}{4} = e^{-\frac{1}{2}\ln(\frac{y}{3})} \qquad \frac{\ln(\frac{y}{3})}{-2} = t$

$\left(\frac{y}{3}\right)^{-1/2}$

$= \frac{y^{-1/2}}{3^{-1/2}}$

$\left(\frac{x}{4}\right)^2 = \left(\frac{\sqrt{3}}{\sqrt{y}}\right)^2$

$\frac{1}{3} \cdot \frac{x^2}{16} = \frac{\cancel{3}}{y} \cdot \frac{1}{\cancel{3}}$

$\begin{array}{r} 1 \\ 16 \\ \times\ 3 \\ \hline 48 \end{array}$

$y \cdot \frac{x^2}{48} = \frac{1}{y} \cdot y \qquad \boxed{x^2 y = 48}$

$\cancel{48} \cdot \frac{x^2 y}{\cancel{48}} = 1 \cdot 48$

Q5: Find a Cartesian equation for the curve given in parametric form by: $x(t) = 2\cos 4t \quad y(t) = 5\sin 4t$

$\sin^2 + \cos^2 t = 1$

$\left(\frac{x}{2}\right)^2 = (\cos 4t)^2 \quad \left(\frac{y}{5}\right)^2 = (\sin 4t)^2$

$\frac{x^2}{4} = \cos^2(4t) \qquad \frac{y^2}{25} = \sin^2 4t$

$\cos^2(4t) + \sin^2(4t) = 1$

$\frac{x^2}{4} + \frac{y^2}{25} = 1$

$\boxed{25x^2 + 4y^2 = 100}$???