1) $x' = e^{x/t} + \frac{x}{t}$ $\Rightarrow$ $x = -\ln\left(-\ln|t| + C\right)$

Hint: $x = tz$

$t \in (-e^C, 0)$ or $(0, e^C)$

2) $x' - 2tx = 2t^3 x^2$ $\Rightarrow$ $x \equiv 0$, $t \in \mathbb{R}$

Hint: $z = x^{-1}$

$x = \left(Ce^{-t^2} + 1 - t^2\right)^{-1}$

3) $x' = \frac{x-t}{x+t}$ $\Rightarrow$ $\frac{1}{2}\ln(z^2+1) + \operatorname{arctg} z = C - \ln|t|$

Hint: $x = tz$

Cannot invert !!

4) $x' - 9t^2 x = (t^5 + t^2)\sqrt[3]{x^2}$, $x(0) = 0$

Hint: $z = \sqrt[3]{x}$ $\Rightarrow$ $x \equiv 0$, $t \in \mathbb{R}$

or $x = \left(Ce^{t^3} - \frac{t^3+2}{9}\right)^3$

5) $t^2 x' = x^2 + 2tx$ $\Rightarrow$ $x = 0$ or $x = -t$, $t \in \mathbb{R}$

Hint: $x = tz$ (or $z = x^{-1}$)

$x = \frac{t^2}{C-t}$, $t \neq C$

6) $2txx' + t^2 - x^2 = 0$ $\Rightarrow$ $x = \pm\sqrt{C^2 - (t-C)^2}$

Hint: $x = tz$ (or $z = x^2$)

$t \in (2C, 0)$ if $C < 0$

$t \in (0, 2C)$ if $C > 0$