a) $e^{2-x} = e^{x} \iff 2 - x = x$

$-x - x = -2$

$-2x = -2$

$x = 1$

$S = \{1\}$

b) $e^{2x+3} = 1 \qquad (e^{0} = 1)$

$e^{2x+3} = e^{0} \iff 2x + 3 = 0$

$2x = -3$

$x = -\frac{3}{2}$

$S = \{-\frac{3}{2}\}$

c) $e^{5-x^2} = e \qquad (e = e^{1})$

$e^{5-x^2} = e^{1} \iff 5 - x^2 = 1$

$-x^2 + 5 - 1 = 0$

$-x^2 + 4 = 0$

$x^2 - 4 = 0$

$(x+2)(x-2) = 0$

$x + 2 = 0$ ou $x - 2 = 0$

$x = -2 \qquad x = 2$

$S = \{-2; 2\}$

d) $e^{-x} = 0$ impossible $S = \emptyset$

e) $2e^{-x} = \dfrac{4}{e^{x}+1}$

$$\frac{2e^{-x}}{1} - \frac{4}{e^{x}+1} = 0$$

$$\frac{2e^{-x}(e^{x}+1) - 4\times 1}{1\times(e^{x}+1)} = 0$$

$$\frac{2e^{-x}e^{x} + 2e^{-x} - 4}{e^{x}+1} = 0$$

$e^{x}+1$ est strictement positive.

$$\Rightarrow \quad 2e^{-x}e^{x} + 2e^{-x} - 4 = 0$$

$$2e^{-x+x} + 2e^{-x} - 4 = 0$$

$$2e^{0} + 2e^{-x} - 4 = 0$$

$$2 + 2e^{-x} - 4 = 0$$

$$2e^{-x} - 2 = 0$$

$$2e^{-x} = 2 \Rightarrow e^{-x} = 1$$

$$\Rightarrow e^{-x} = e^{0} \Rightarrow x = 0 \Rightarrow S = \{0\}$$

f) $2e^{-x} = \dfrac{1}{e^{x}+1}$

$$\frac{2e^{-x}}{1} - \frac{1}{e^{x}+1} = 0$$

$$\frac{2e^{-x}(e^{x}+1) - 1\times 1}{1(e^{x}+1)} = 0$$

$$\frac{2e^{-x}e^{x} + 2e^{-x} - 1}{e^{x}+1} = 0$$

$e^{x}+1$ est strictement positive

$\Rightarrow 2e^{-x}e^{x} + 2e^{-x} - 1 = 0$

$$2 + 2e^{-x} - 1 = 0$$

$$2e^{-x} + 1 = 0$$

$$2e^{-x} = -1$$

$$e^{-x} = -\frac{1}{2}$$ impossible

$\Rightarrow S = \emptyset$