* If there is a log on both sides, set the arguments equal.
* If there is a log on only one side, combine and change to exponential form

Section 9.3 – Properties of Logarithms
Day 2

key

You can use the properties of logarithms to solve equations involving logarithms.
Use the properties in reverse to write each side of the equation as a single logarithm.

Solve each equation.

1) $2\log_7 x = \log_7 27 + \log_7 3$

$\log_7 x^2 = \log_7 (27 \cdot 3)$

$x^2 = 81$

$\boxed{x = 9}$

2) $\log_6 x + \log_6 (x+5) = 2$

$\log_6 x(x+5) = 2$

$6^2 = x^2 + 5x$

$0 = x^2 + 5x - 36$

$0 = (x+9)(x-4)$

$x = -9, \boxed{4}$

3) $2\log_4 (x+1) = \log_4 (11-x)$

$\log_4 (x+1)^2 = \log_4 (11-x)$

$x^2 + 2x + 1 = 11 - x$

$x^2 + 3x - 10 = 0$

$(x+5)(x-2) = 0$

$x = -5, \boxed{2}$

4) $2\log_2 x - \log_2 2 = 3$

$\log_2 x^2 - \log_2 2 = 3$

$\log_2 \frac{x^2}{2} = 3$

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

$16 = x^2$

$\boxed{4 = x}$

You try☺

5) $\log_6 (a^2+2) + \log_6 2 = 2$

$\log_6 2(a^2+2) = 2$

$6^2 = 2a^2 + 4$

$32 = 2a^2$

$16 = a^2$

$\boxed{\pm 4 = a}$

6) $\log_3 5 = \log_3 x + \log_3 3$

$\log_3 5 = \log_3 (3x)$

$5 = 3x$

$\boxed{\frac{5}{3} = x}$