We can, if the base of the logs are the same, equate the arguments,

$\log_a(\text{stuff}) = \log_a(\text{other stuff})$

stuff = other stuff

HW 4R
p.130
#1 abd

**Ex1** Solve $\log_5(2-x) = \log_5(6x-1)$

$2 - x = 6x - 1$

$+1 \quad 3 = 7x$

$\frac{3}{7} = x$

* may have to simplify first:

$2\log_3(x) + \log_3(3x) = \log_3(15)$

$\log_3(x^2) + \log_3(3x) = \log_3(15)$

$\log_3(3x^3) = \log_3(15)$

$3x^3 = 15$

$x^3 = 5$ $\sqrt[3]{\ }$

Ex 2) $\log_2(x) + \log_2(x-2) = 3$

convert to exponential

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

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

$2^3 = x^2 - 2x$

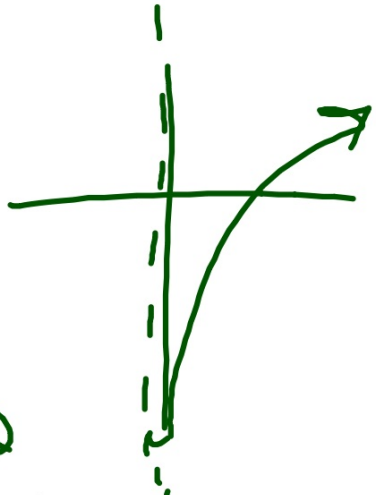
$x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$x = 4$ or $x = -2$

Check to see what works

$x = -2$ DOES NOT




HW 45 p 131
#1, 2 abc
3, 4

1h) $e^{\frac{x}{5}} = 0.11$

$\ln(e^{\frac{x}{5}}) = \ln(0.11)$

$5 \cdot \frac{x}{5} \cancel{\ln e} = \ln(0.11) \cdot 5$

$x = 5\ln(0.11)$

$x \approx -11.0$

4S 2b) $\log_2(4x-8) - \log_2(x-5) = 4$

$$\log_2\left(\frac{4x-8}{x-5}\right) = 4$$

$$\frac{4x-8}{x-5} = 2^4$$

$$(x-5)\frac{4x-8}{x-5} = 16(x-5)$$

$$4x-8 = 16x-80$$

$$72 = 12x$$

$$6 = x$$

2c) $\log_7(2x-3) - \log_7(4x-5) = 0$

$\log_7(2x-3) = \log_7(4x-5)$

$2x-3 = 4x-5$

$2 = 2x$

$1 = x$

3) $\log_2 x + \log_2(2x+7) = \log_2 A$

$\log_2(x(2x+7)) = \log_2 A$

$x(2x+7) = A$

$2x^2+7x = A$

$2x^2+7x = 2$

$2x^2+7x-2 = 0$

$$\log_4 x + \log_x 4 = 2$$

$\log_4 x$

$$\left(\log_4 x + \frac{\log_4 4}{\log_4 x}\right) = (2)\log_4 x$$

$x = 4$

$$t + \frac{1}{t} = 2$$

$$(\log_4 x)^2 + \log_4 4 = 2\log_4 x$$

$a = \log_4 x$

$$(\log_4 x)^2 - 2\log_4 x + 1 = 0$$

$$a^2 - 2a + 1 = 0$$

$$(a-1)(a-1) = 0$$

$$a = 1 \iff \log_4 x = 1$$

$$4^1 = x \Rightarrow x = 4$$