

**Ex 6** Solving a Log Equation

$$\log(x+6) - \log(x+2) = \log x$$

$$\log\left(\frac{x+6}{x+2}\right) = \log x$$

$$\cancel{(x+2)} \frac{x+6}{\cancel{x+2}} = \frac{x}{1} \quad \text{(x+2)}$$

$$\begin{array}{r} x+6 \\ -x \\ \hline \end{array} = \begin{array}{r} x^2 + 2x \\ -x \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ -6 \\ \hline \end{array} = \begin{array}{r} x^2 + x \\ -6 \\ \hline \end{array}$$

$$0 = x^2 + x - 6$$

$$0 = (x+3)(x-2)$$

$$\begin{array}{r} 0 = x+3 \\ -3 \quad -3 \\ \hline \end{array}$$

$$\cancel{-3 = x}$$

reject

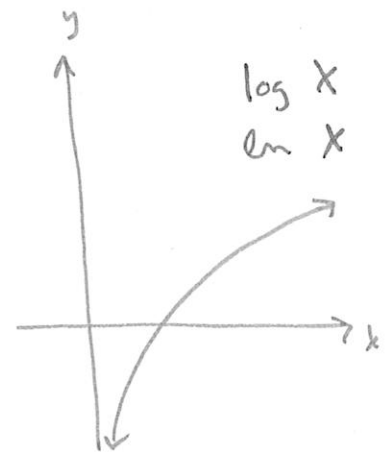
negative argument

~~log(-3)~~

$$\begin{array}{r} 0 = x-2 \\ +2 \quad +2 \\ \hline \end{array}$$

$$\boxed{2 = x}$$

ac	b
-6	1
3(-2)	3-2=1



4.5

Day 2 (2)

**Ex 7** Solve

$$\log_2 [(3x-7)(x-4)] = 3$$

$$2^3 = (3x-7)(x-4)$$

$$8 = 3x^2 - 12x - 7x + 28$$

$$8 = 3x^2 - 19x + 28$$

$$\begin{array}{r} -8 \\ \hline 0 = 3x^2 - 19x + 20 \end{array}$$

$$0 = \frac{3x^2}{3x} - \frac{15x}{3x} - \frac{4x}{-4} + \frac{20}{-4}$$

$$= 3x(x-5) - 4(x-5)$$

$$0 = (3x-4)(x-5)$$

$$3x-4=0$$

$$+4 \quad +4$$

$$\frac{3x}{3} = \frac{4}{3}$$

$$x = \frac{4}{3}$$

$$x-5=0$$

$$+5 \quad +5$$

$$x = 5$$

(check  $\rightarrow$  negative?)

$$(3(\frac{4}{3})-7)(\frac{4}{3}-4)$$

$$(-3)(-1) \quad \text{OK}$$

$$(3(5)-7)(5-4)$$

$$+ \quad + \quad \text{OK}$$

$$\begin{array}{r|l} 60 & -19 \\ \hline (-15)(-4) & -15-4=-19 \end{array}$$

4.5

**Ex 9**

Day 2

3

$$\ln e^{\ln x} - \ln(x-3) = \ln 2$$

$$\log_e e^{\ln x} = Q$$

$$e^Q = e^{\ln x}$$

$$Q = \ln x$$

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

$$\ln\left(\frac{x}{x-3}\right) = \ln 2$$

$$\cancel{(x-3)} \frac{x}{\cancel{x-3}} = 2(x-3)$$

$$\begin{array}{r} x = 2x - 6 \\ -2x \quad -2x \\ \hline \end{array}$$

$$\frac{-x}{-1} = \frac{-6}{-1}$$

$$\boxed{x = 6}$$

Check!

$$\ln(6-3)$$

3 "+" OK