$t = 3^x$

$3^x + 2(3^{-x}) = 3 \rightarrow t + 2(1/t) = 3 \rightarrow (t + \frac{2}{t} = 3)t$

$t^2 + 2 = 3t \rightarrow$

$t^2 - 3t + 2 = 0$

$(t-1)(t-2) \quad t=1$

$t=2$

$t=1 \rightarrow 3^x = 1 \quad \log_3(1) = 0$

$t=2 \rightarrow 3^x = 2 \quad \log_3(2) = 0.631$

solving equations cont

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ex solve $e^{2x} - 3e^x - 10 = 0 \qquad t = e^x$

$t^2 - 3t - 10 = 0$

$(t-5)(t+2) \qquad t=5 \rightarrow e^x = 5 \qquad \ln(5) = 1.609$

$t^2 + 2t - 5t - 10 \qquad t=-2 \rightarrow e^x = -2 \qquad \ln(-2) =$ N/A

ex $\left(\frac{2}{3+2(5^{0.1x})} = \frac{1}{2}\right) 3+2(5^{0.1x})$

$(2 = \frac{1}{2}(3+2(5^{0.1x}))) 2$

$4 = 3 + 2(5^{0.1x})$

$-3 \quad -3$

$\frac{1}{2} = \frac{2(5^{0.1x})}{2}$

$\rightarrow \frac{1}{2} = 5^{0.1x} \qquad (a^b = c \Leftrightarrow b = \log_a(c))$

$0.1x = \log_5(1/2) = \frac{\ln(1/2)}{\ln(5)} = -0.4307$

$x = \frac{-0.4307}{0.1} = \boxed{-4.307}$

Solving inequalities w/ expon func

- Keep in mind:
  - If $a>1$: $a^b > c \iff b > \log_a(c)$ (same sign)
  - If $0<a<1$: $a^b > c \iff b < \log_a(c)$ (switch sign)

(ex) $2^x > 3 \longrightarrow x > \log_2(3) \longrightarrow x > \frac{\ln(3)}{\ln(2)} = 1.585$

$\boxed{\text{Solution: } x \in (\log_2(3), \infty)}$ or $x \in (1.585, \infty)$

(ex)

$4\left(\frac{2}{3}\right)^x - 1 > 2 \longrightarrow 4\left(\frac{2}{3}\right)^x > 3 \longrightarrow \left(\frac{2}{3}\right)^x > 3/4$

$+1 \quad +1 \qquad \times \frac{1}{4}$

↳ less than 1

$x < \log_{2/3}(3/4)$ ↳ $\boxed{x \in (-\infty, 0.7095)}$

$\frac{\ln(3/4)}{\ln(2/3)} = 0.7095$

(ex) $2 - 3(5^{-x}) \leq 1$

$-2 \qquad -2$

$(-3(5^{-x}) \leq -1)\ -\frac{1}{3}$

$5^{-x} \geq 1/3$

$(-x \geq \log_5(1/3))\ -1$

$x \leq -\log_5(1/3)$

$\boxed{x \in (-\infty, -\log_5(1/3))}$

(ex) $e^{2x} - 3e^x + 2 < 0 \qquad t = e^x$

$t^2 - 3t + 2 < 0$

$(t-2)(t-1) < 0$

$1 < t < 2 \longrightarrow 1 < e^x < 2$

$\longrightarrow \ln 1 < \ln e^x < \ln 2$

$0 < x < \ln 2$

domain:

$\boxed{x \in (0, \ln 2)}$

t	1	2	
$t-1$	$-$ 0	$+$	$+$
$t-2$	$-$	$-$	0 $+$
$(t-1)(t-2)$	$+$ 0	$-$	0 $+$

has to be <0, so $-$