

$$4) 2 \log_{10}(\sqrt{x}) - \frac{1}{2}$$

$$\log_{10}(\sqrt{x})^2 \rightarrow x$$

$$\log_{10}(x) - \frac{1}{2} \rightarrow \log_{10}(x) - \log_{10}(10^{1/2})$$

$$= \log_{10}(x/10^{1/2}) \rightarrow \log_{10}(x/\sqrt{10})$$

change of bases

13 april 2023

$$\triangleright a^c = (b^{\log_b a})^c = b^{c \log_b a}$$

$$\triangleright \log_a c = \frac{\log_b c}{\log_b a}$$

ex

$$\log_2(3) = \frac{\ln(3)}{\ln(2)} = 1.58$$

$$5^6 = 10^x \rightarrow (10^{\log_5 5})^6 \rightarrow 10^{6 \log_5 5} \rightarrow x = 4.194 \rightarrow 10^{4.194} = 5^6$$

Solve equations involving exponential func

$$\triangleright - a^b = c \iff b = \log_a c$$

$$\triangleright - a^b = c \iff a = \sqrt[b]{c} \text{ or } c^{1/b} \text{ (if } a > 0)$$

$$z^3 = 8 \quad 3 = \log_2 8$$

$$z = \sqrt[3]{8}$$

$$a^2 = c \quad a =$$

ex

$$4^x = 8 \rightarrow x = \log_4(8) \rightarrow \frac{\ln(8)}{\ln(4)} = x = 1.5$$

$$x^4 = 8 \rightarrow x = \pm \sqrt[4]{8} \text{ or } 8^{1/4} \rightarrow x = \pm 1.68$$

$$3 + 5e^{-2x} = 7 \rightarrow 5e^{-2x} = 4 \rightarrow -2x = \log_e(4/5) \rightarrow -2x = -0.223$$

$$e^{-2x} = 4/5$$

$$x = 0.112$$

$$\frac{\ln(4)}{\ln(e)} = (1.38)5$$

$$-2x = \log_e(4/5)$$

$$\ln(4/5) = -0.223$$

-2

$$x = -3.47$$

$$t = 3^x$$

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

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

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

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

$$t=2$$

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

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

solving equations cont

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(ex) solve $e^{2x} - 3e^x - 10 = 0$

$$t = e^x$$

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

$$(t-5)(t+2)$$

$$t^2 + t - 5t - 10$$

$$t=5 \rightarrow e^x = 5$$

$$\ln(5) = 1.609$$

$$t=-2 \rightarrow e^x = -2$$

$$\ln(-2) = \text{N/A}$$

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

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

$$\left(2 = \frac{1}{2} (3+2(5^{0.1x})) \right) \cdot 2 \quad 0.1x = \log_5(1/2) = \frac{\ln(1/2)}{\ln(5)} = -0.4307$$

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

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

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