

Very quick log and exponential review:

$$y = b^x \Leftrightarrow x = \log_b y$$

identities

$$\log_b 1 = 0$$

$$\log_b(xy) = \log_b x + \log_b(y)$$

$$\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$$

$$\log_b x^n = n \log_b x$$

$$\log_b b = 1$$

change of base

$$\begin{aligned} \log_b a &= \frac{\log_{10} a}{\log_{10} b} \\ &= \frac{\ln a}{\ln b} \end{aligned}$$

ex 1

$$20 \left(\frac{1}{2}\right)^{\frac{x}{3}} = 5$$

$$\log \left(\frac{1}{2}\right)^{\frac{x}{3}} = \log \frac{1}{4}$$

$$\frac{x}{3} \left[ \log \left(\frac{1}{2}\right) \right] = \log \left(\frac{1}{4}\right)$$

$$\frac{x}{3} = \frac{\log \left(\frac{1}{4}\right)}{\log \left(\frac{1}{2}\right)}$$

$$x = 3 \frac{\log \left(\frac{1}{4}\right)}{\log \left(\frac{1}{2}\right)}$$

$$x = 6$$

$$\frac{e^x - e^{-x}}{2} = 5$$

$$e^x - e^{-x} = 10$$

$$e^x - \frac{1}{e^x} = 10$$

multiply  $e^x$

$$(e^x)^2 - 1 = 10e^x$$

$$y^2 - 10y - 1 = 0$$

$$(e^x)^2 - 10e^x - 1 = 0$$

$$e^x = \frac{10 \pm \sqrt{104}}{2}$$

$$e^x = 10.1 \quad \text{or} \quad e^x = \cancel{-0.999}$$

$$x = \ln(10.1)$$

$$x = \log_e(10.1)$$

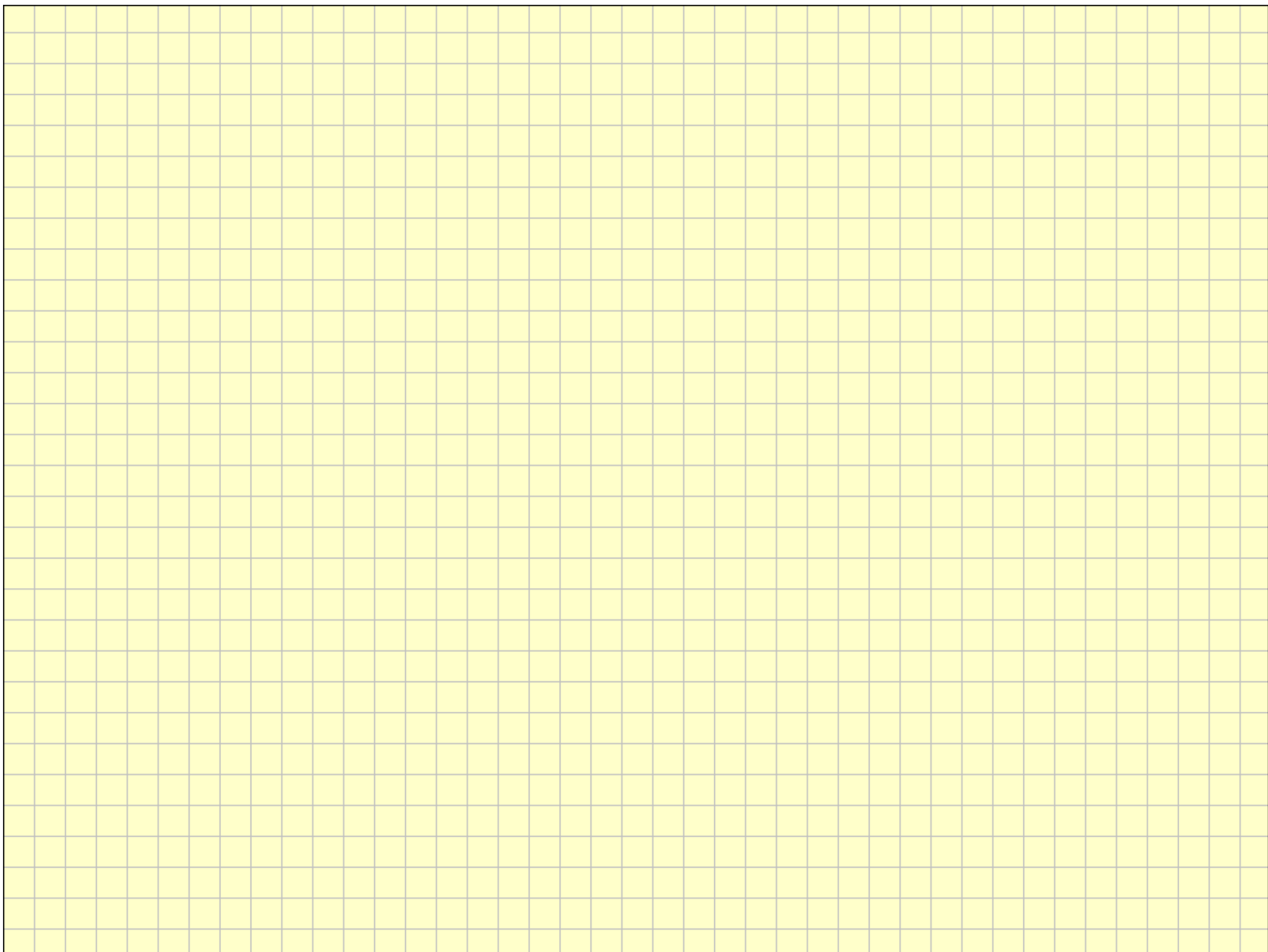
$$\log_{10}(x^2) = 2$$

$$10^2 = x^2$$

$$100 = x^2$$

$$\pm \sqrt{100} = x$$

$$\pm 10 = x$$



$$\log x - \frac{1}{2} \log (x+4) = 1$$

$$\log x - \log (x+4)^{\frac{1}{2}} = 1$$

$$\log \left[ \frac{x}{(x+4)^{\frac{1}{2}}} \right] = 1$$

$$(10^1)^2 = \left( \frac{x}{(x+4)^{\frac{1}{2}}} \right)^2$$

$$100 = \frac{x^2}{x+4}$$

$$100(x+4) = x^2$$

$$100x + 400 = x^2$$

$$0 = x^2 - 100x - 400$$

$$x = 103.85 \quad \text{or} \quad x = \cancel{-3.85}$$

can't take  
 $\log(\text{neg.})$

HW

WS

1-17,  
odd

25-37  
odd