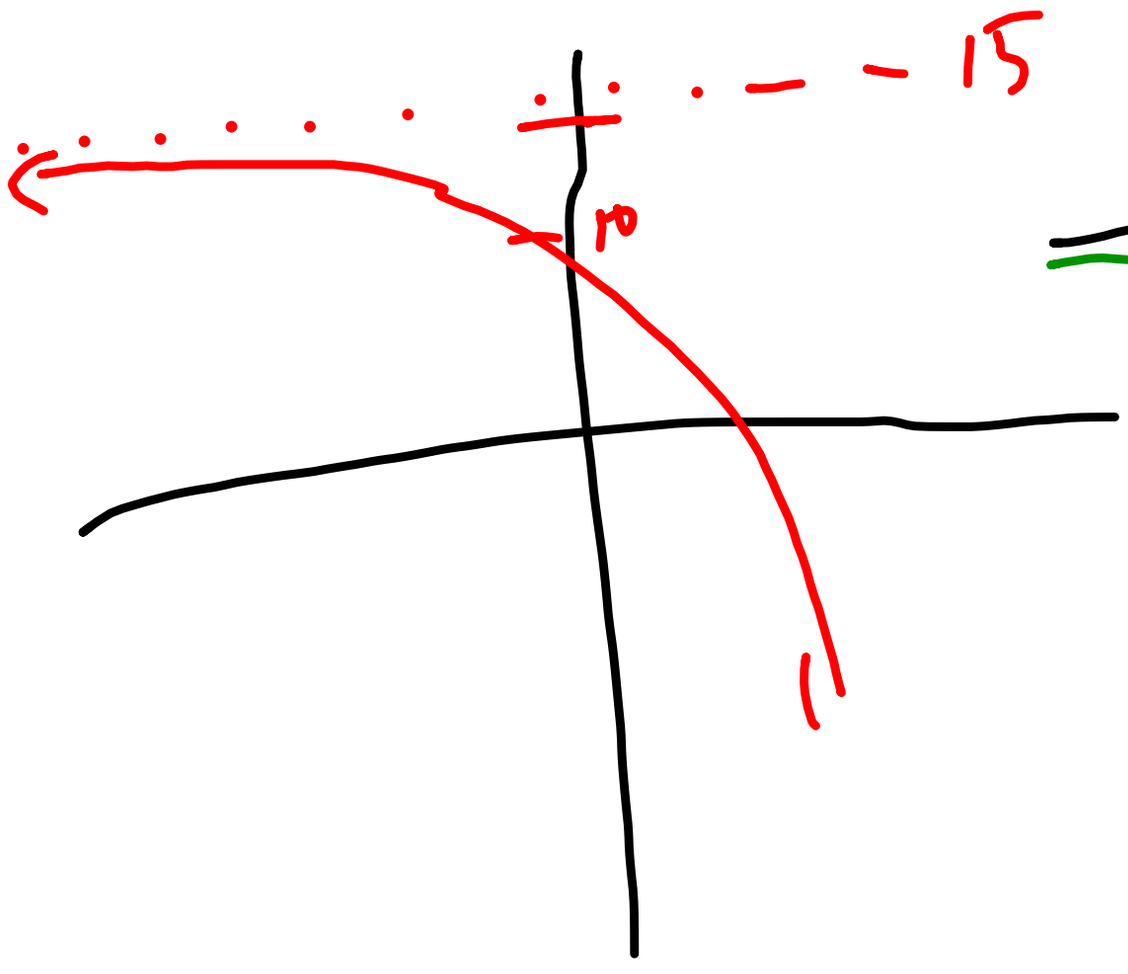
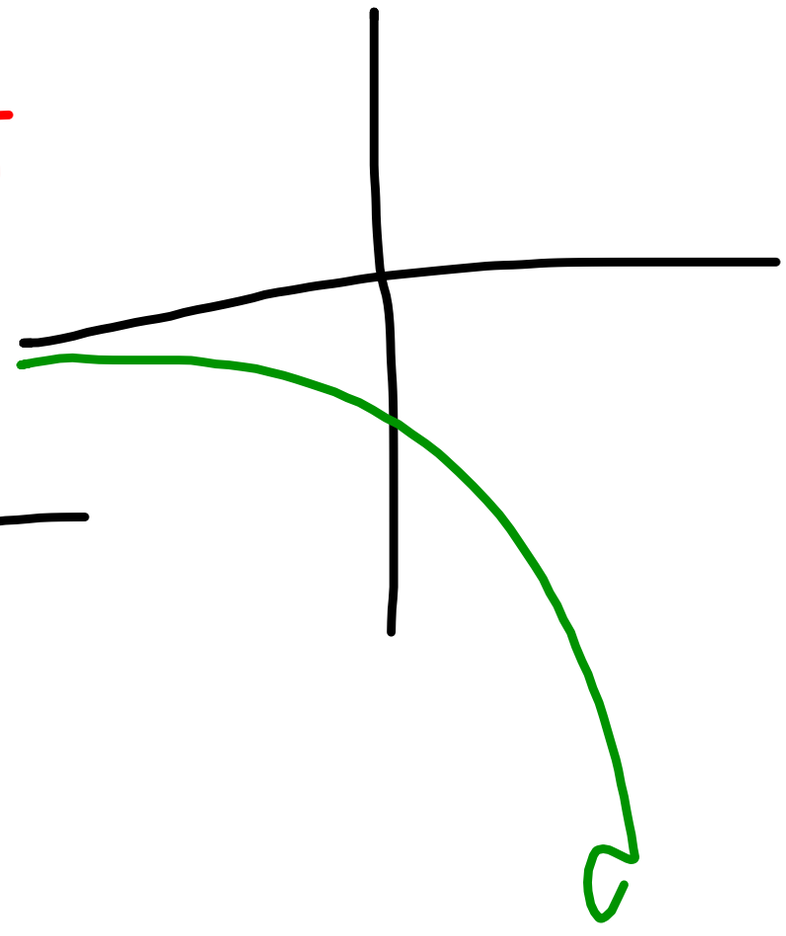
37

$$\lim_{x \to -\infty} \left(15 - 5e^{3x}\right)$$

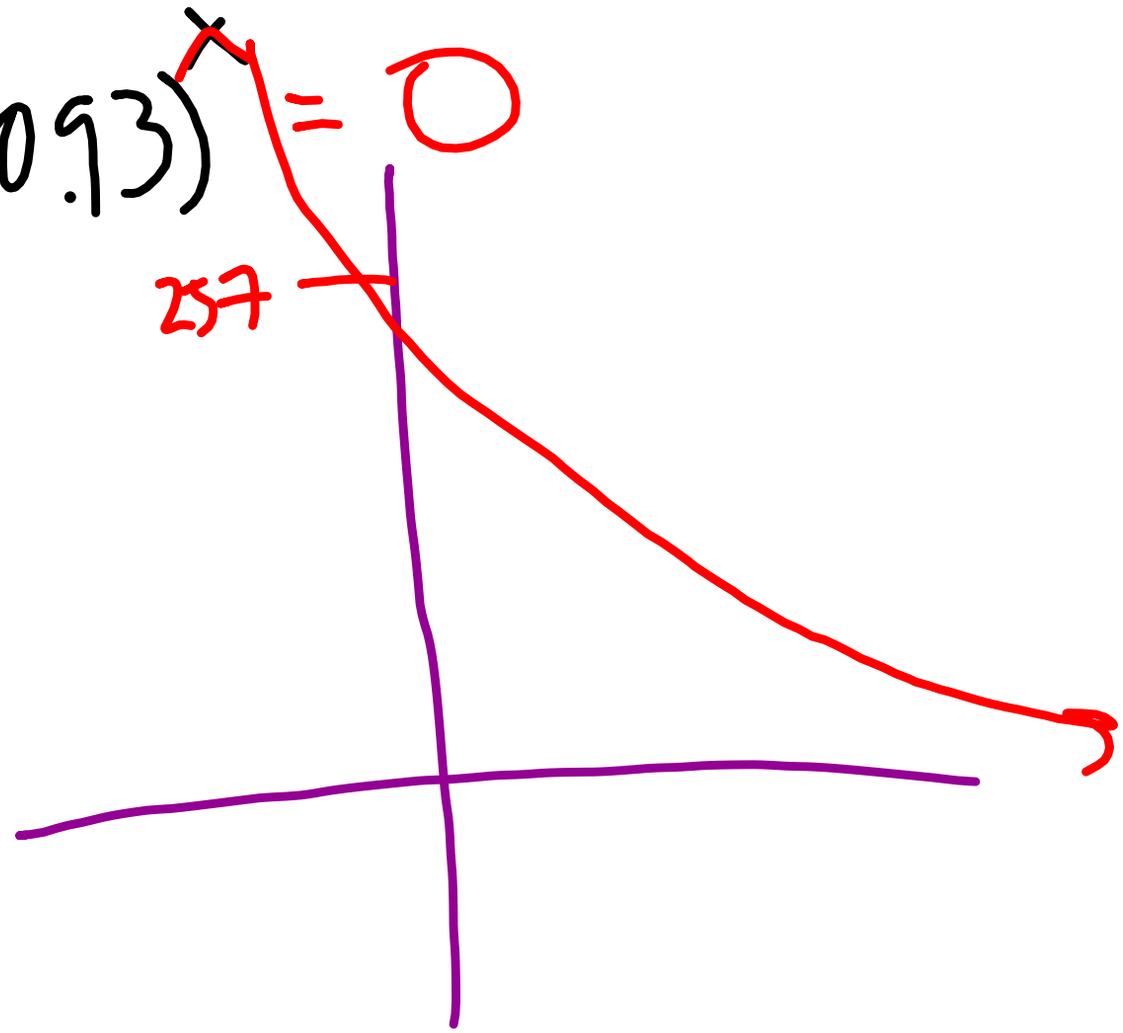
$y = -5e^{3x}$





35]

$$\lim_{x \to \infty} 257(0.93)^x = 0$$

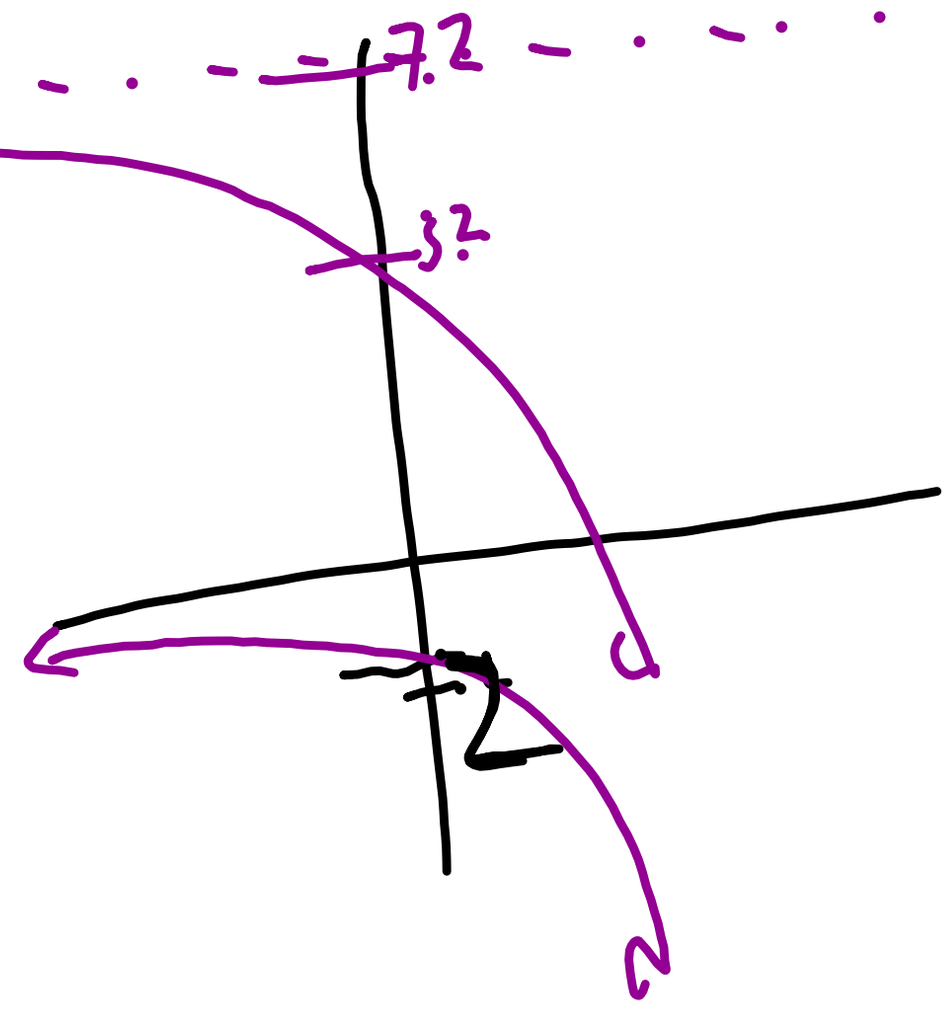


39)

$$\lim_{x\to\infty}\left(7.2-2e^{3x}\right)=-\infty$$

$y=-2e^{3x}$

$x\to\infty$



as $x\to\infty$

$f(x)\to-\infty$

Logarithms (Inverse exponentials)

Inverses generally: $f(x) = x$

$g(x) = \frac{1}{x}$

composition $(f \circ g)x = f(g(x))$

When you compose 2 functions and you get the "do nothing" function then those 2 functions are inverses.

Def identity function $f(x) = x$.

ex $f(x) = \sin x$
$g(x) = \arcsin x$

ex $f(x) = 2x$

$g(x) = \frac{1}{2}x$

---

ex $f(x) = x^2$

$g(x) = \sqrt{x}$

---

ex $f(x) = 3x - 1$

to find the inverse $x \leftrightarrow y$

$x = 3y - 1$

$\frac{x+1}{3} = y \rightarrow g(x) = \frac{x+1}{3} = f^{-1}(x)$

Exponentials

$y = ab^x$ let $a = 1$

$y = b^x$ $b = 10$

$y = 10^x$

making the inverse:

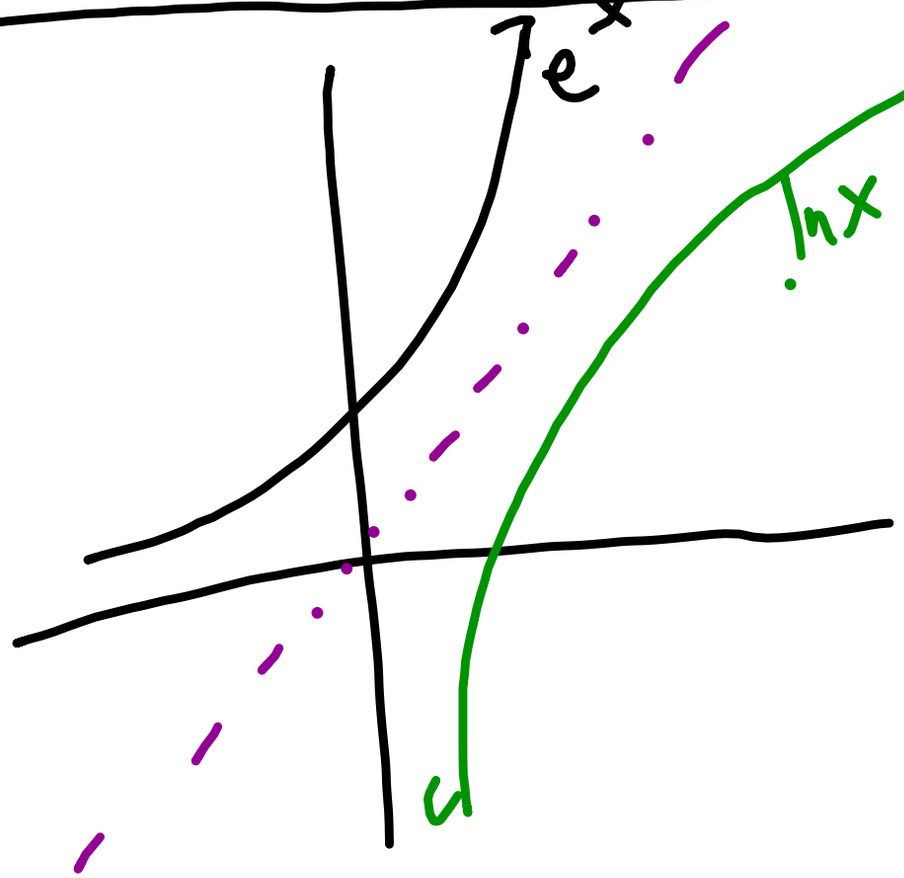
$$x = 10^y \iff y = \log_{10}(x)$$

ex

$$\log(1{,}000{,}000) = 6$$

ex $\log_2 16 = 4$

ex $\ln(e^3) = \log_e(e^3) = 3$



Range of $\ln x$: $\{\mathbb{R}\}$

Domain $\ln x$ $\{x \mid x>0\}$

Properties

① $e^a \cdot e^b = e^{a+b}$ $\longleftrightarrow$ $\ln(AB) = \ln A + \ln B$

② $e^a \cdot e^{-b} =$ $\longleftrightarrow$ $\ln\left(\frac{A}{B}\right) = \ln A - \ln B$ //

③ $\ln(1) = 0$, $\log_b(1) = 0$

④ $\ln(A^n) = n \ln A$ #bella